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A study of attrition relative to institutional performance policies within the context of the unique environment of Springfield Technical Community College.

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A STUDY OF ATTRITION RELATIVE TO INSTITUTIONAL PERFORMANCE AND MANAGEMENT POLICIES WITHIN THE CONTEXT OF THE UNIQUE ENVIRONMENT OF SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

A Dissertation Presented

By

J. Stanley Cummings

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A C K N O W L E D G E M E N T S

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ABSTRACT

A Study of Attrition Relative
To Institutional Performance and Management Policies
Within the Context of the Unique Environment of
Springfield Technical Community College

(February 1978)

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Over the past decade more and more institutions of higher education have found themselves under mounting pressures to justify and defend their operating policies especially those that have fiscal implications. One indicator of the "holding power" of an institution is its student attrition record. Although for some students, dropping out of college may be beneficial for both the early leaver and the institution, few educators would dispute that withdrawing from college before graduation can be a costly experience, taking its toll emotionally and financially on the student, in diminished prestige and nonproductive effort for the school and, in the opinion of many, in misspent public dollars.

The major purpose of this investigation is to determine the relationship between various student and departmental characteristics and the attrition rate in career-oriented divisions of a two-year technical school, Springfield Technical Community College in Springfield, Massachusetts.

Student attrition was explored using a discriminant analysis procedure for the total student sample and for each of the three career divisions.

Departmental characteristics were derived for the same thirty-five career departments in the technical, health and business fields from which the student sample was drawn. Six departmental indicators were examined with rankings made by department heads and deans using available data.

The relationship between departmental rankings on six indicators and established attrition patterns was explored using canonical correlation.

Results and Conclusions.

Student characteristics. Two significant discriminant functions beyond the .001 level resulted from the discriminant analysis of student characteristics. The strongest set of predictors (Wilks Lambda = .833; p is less than .0001) found was the combination high school rank and sex. Females with high ranks tended to be graduates (persisters and finishers). The second function (Wilks Lambda = .924; p. is less than .0001) was primarily an age function which distinguished persisters and defaulters from the four other attrition groups.

The discriminant analyses executed separately for each of the three career divisions were parallel in results to the overall analysis reported above. Within the business division, the SES variate appeared as a predictor, a result that did not occur elsewhere.

Department characteristics. A single canonical correlation (Wilks Lambda = .079; p less than .0001) was found in analyzing the

relationship of departmental characteristics to attrition. Generally, the higher a department was ranked on any characteristic, the greater was the percentage of persisters. The single best set of predictors from the canonical analyses was number of openings and selectivity in admissions policy. The results indicate that a department that has fewer numbers of openings relative to number of applicants and which is more selective in its admissions policy is more likely to have more of its students graduate.

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CHAPTER I

INTRODUCTION TO THE PROBLEM

Statement of Research

As will be shown in this study, there is a growing belief among educators that an increasing number of U.S. colleges have arrived at the point where the need for institutional development and a continuing improvement process has become the sine qua non of their future operational stability and, in some instances, possibly of their survival as viable facilities of higher learning. This concern suggests that unless positive steps are taken to counteract: (1) a widespread dissatisfaction with much that has happened and is happening in colleges and universities, and (2) the increasing reluctance of funders, especially those involved with public higher education, to maintain adequate budget levels, these two factors could easily result in the failure of many such institutions to bring about these crucial improvements. Thus any plan which leads to more effective and efficient management should enhance these schools' potential for obtaining the additional financial resources they require to assure academic responsiveness, scholarly integrity and the capability to function as healthy, purposeful organizations. One such plan is an improvement in student retention.

Problem to be Solved

The problem this study is designed to solve is an examination of selected variables relating to the dropout records of students in three

major divisions (and their respective departments) at Springfield Technical Community College (STCC) in Springfield, Massachusetts and includes a correlation of such attrition data with the results of an analysis of the configuration of these divisions and departments in respect to their individual admissions criteria and classroom characteristics. This information is to be used to meet the study's basic goal which is to develop policies aimed at bettering student staying power at STCC.

This intelligence should, in turn, enable the college to propose acceptable solutions including policies of intervention aimed at decreasing attrition and thereby affect operating efficiences and economies within the context of STCC's unique environment, its student clientele and the stated mission and goals of the college.

The study's purpose is to collect such attrition data for use as part of the college's total information base needed for planning operational strategies for the improvement of STCC's overall institutional management.

Specific objectives. In acquiring this data, the following objectives will be sought:

-- Identify those variables common to students falling within the attrition categories designated for the study;
-- Identify selected characteristics of divisions and departments within divisions;
-- Correlate student data within and across divisions and and departments;

-- Relate this information to acceptable solutions designed to improve student retention.

Justification for study. The pattern of a growing number of poorly prepared applicants combined with the continuing effort on the part of STCC to offer academically demanding career training to those who qualify have created a non-linear demand on the college's limited resources and have already forced the institution to cut corners in its attempts to respond to its total students needs, retrenching at the very time when it actually requires a larger per student financial commitment merely to keep up with its past performance. New multiplying and compounding factors such as dwindling tax revenues, inflation, rising budgets, faculty wage demands, high energy costs and a need to continually update training facilities (critical in a technical institution) could easily culminate in a static or even regressive growth pattern at STCC in the years ahead. Even the current trend toward level budget funding carries with it the implication of cutbacks since inflation cannot be factored into a pure level funding formula without an offsetting decrease in staff and services. This situation has been further exacerbated at STCC and at many inner-city colleges by the demands placed on their resources in the area of compensatory and remedial education. With the presence of such constricting factors, the potential for harsh staff, program and student reductions is always present. Therefore, any steps which lead to a bettering of student retention and, by extention, to an improvement in the school's overall performance record are highly desirable.

Due to the costly ramifications of a high dropout rate, the rationale for selecting a study of attrition and proposing policies of intervention designed to decrease withdrawals can be justified in that such activities should be an integral part of the planning process of every institution of higher learning, particularly in fiscally perilous times. This rationale becomes even more valid at tax-supported community colleges faced with the challenge of meeting the widely diverse needs of a heterogeneous student population. Analyzing attrition on division and department levels and developing policies to minimize withdrawals based on such data are part of the effort educators should make in an era of mounting emphasis on accountability. For, as already stated, increasingly, in a very tangible way, the vitality and, in some cases, the future of many urban colleges may hinge upon their overall performance records and, one aspect of that performance is student retention. For this reason, the availability of accurate attrition data should be a major component in an institution's total information base for formulating broad, effective strategies leading to improved management.

Attrition: Growing in Significance as a Measure of Institutional Performance

It should be noted that in conducting this study and analysis, the author makes no contention that high attrition or the term "dropout" necessarily carry a negative implication. For, as will be seen in this section, there is a sizeable school of opinion which holds that withdrawing from college may be entirely appropriate and even beneficial for the withdrawer depending upon his or her individual situation.

Rather, in view of pressures now being placed upon administrators regarding total institutional accountability, the author maintains that since improving student retention is one measure receiving additional scrutiny by funders, an analysis of institutional attrition performance warrants close examination by academic researchers.

Granting the validity of the argument that dropping out is not perforce a negative experience, a college's dropout rate is nevertheless one aspect of its record which many non-academicians, as well as many within education itself, tend to correlate with success when evaluating institutional performance. If a school has good "holding" power, it is doing a good job; conversely, a high rate of early leavers is often construed as evidence that education is failing its mission. Moreover, in a public college or university, this reasoning may lead to the inference that a large number of non-persisters can be directly equated with a wasting of tax revenue.

As previously stated, it is true that not everyone shares the feeling that withdrawing is detrimental to the dropout. Some dispute the onus commonly attached to leaving school early and challenge the "A high dropout rate is bad" syllogism as spurious and overly simplistic. They claim, for instance, that "stopouts"--students who leave school to work, travel or even do nothing, later return better prepared, at least psychologically, to undertake academic pursuits. Likewise, others feel that "jobouts"--those who withdraw from college before graduation for permanent employment (often related to their previous studies)--are inappropriately categorized as dropouts since these leavers may be better suited and happier as fulltime members of the workforce than in the classroom.

Granting the plausibility of such arguments, the author feels it is difficult to challenge the general connotation of lack of success which has traditionally been associated with leaving school early. It is still common, for example, to hear of official college attitudes which allude to the act of students withdrawing as being a kind of death, albeit only an intellectual one. In educational circles, those who depart from school before their classmates are regularly referred to as casualties or non-survivors. And who has not heard the dropout figure called the "mortality rate?" Moreover, there are probably few inside, or outside, of education who would argue, regardless of their personal feelings on the matter, that dropping out of school can be an expensive experience taking its toll financially (and sometimes emotionally) on the student, in diminished cost-effectiveness and lowered prestige on the institution and, in the minds of many, in misspent public dollars.

Interest in attrition. As seen in Chapter II (Review of Literature), researchers and educators have not been lacking in interest in the problem of dropouts. To the contrary, it is a subject which has received intense scrutiny for decades.[1] Their concern, however, seems to have been, by and large, related to the fact that if one loses thirty percent of a group, as educators, they wanted to be certain these students were lost for "good" reasons. Administratively, of course, each college had to decide for itself what represented a reasonable dropout rate and what constituted a "good" reason for withdrawal.

Nevertheless, the dropout stigma seems to persist. And given the mounting emphasis on institutional cost effectiveness and administrative belt-tightening, the implications of high attrition rates may become

even more important in the years ahead placing those colleges with high withdrawal patterns in an increasingly untenable and insecure position.

In Profile of a Dropout, Schreiber provides a clue why attrition may become such a pivotal factor for measuring institutional performance--and thus impinge directly on budgetary allocations--in the near future.

> The concern for the school dropout is not a new phenomenon, but the problem of the school dropout is. Less than two decades ago, when more students dropped out of school than graduated, there was no noticeable public concern. A boy could leave school, find a job, and become an adult; today he quickly finds out that he is no longer wanted by industry. Instead of a job, he has a promise of long periods of unemployment, interspersed with short periods of working at dead-end, unskilled jobs for low wages.[2]

While Profile of a Dropout deals with secondary schools, the current large-scale movement of high school graduates, many of marginal abilities, into college, especially two-year public colleges, could well portend such institutions experiencing similar problems and criticisms if their dropout rates are high. And ironically, when college enrollments level off, as most population experts predict will be the case in the early or mid-1980s, the dilemma may become even more agonizing since one of the basic criteria used by funders when structuring budgets is absolute numbers. Thus it might be postulated that while little or nothing can be done to counter the predicted trend of diminishing numbers of enrollees, it would seem that one task incumbent upon all institutions of higher learning would be to analyze those variables which characterize their students and departments in order to take steps to improve overall performance in the area of student retention if such facilities are to remain viable and healthy.

As far back as 1968, twenty-three community colleges in Northern California agreed to form a consortium to engage in research on issues

its members considered important. The first problem identified when the group reviewed national community college enrollments was that, typically, second-year student classes were forty-eight percent the size of freshman enrollments. As a result, the need to understand a possible attrition rate of fifty-two percent and find ways to reduce this figure was given top priority by the group.[3]

In the lead article of the September 22, 1975 Chronicle of Higher Education, MacMillan and Kester described a survey conducted by the Iowa Board of Regents to find what measures were used when academic programs were eliminated in other states. Based on a poll originally suggested by the Education Commission of the States, the two criteria cited by the largest number of respondents (e.g., states) as reasons for discontinuing programs pertained directly to enrollments and attrition. The largest (total) number of states reporting a single reason responded that the number of graduates from a program in each of the previous five years was the primary reason for maintaining or dropping a program. Ten states, the second largest aggregate number answering, stated that the number of students enrolled in a program and the number leaving it before graduation were the major factors for considering the possible elimination of programs. Further evidence of the rising importance of attrition was evidenced in a survey of top officials at 1200 colleges and universities which predicted that a sharp increase in (1) the elimination and consolidation of programs and (2) institutions being phased out of existence altogether either through diminishing enrollments or attrition would be a likely occurrence during the next fifteen years.[4]

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These multiplying and compounding problems are not only noticeably straining the fiber of higher education at present but may become even more acute later on given the fait accompli of dwindling enrollments in primary and secondary school populations--the college matriculants of the near future. One result of this changing climate is that funders, and many in the general public as well, caught between the economic realities of inflation and diminishing revenues and a network of tax-supported institutions (academic and others), each of which is constantly seeking additional support, are no longer requesting, but are demanding that those charged with conducting the affairs of public facilities provide a strict accounting of their stewardships. Educators, who in the past were often accused of retreating to their ivory towers, would appear to no longer have even that option as they find themselves under increasing pressure to justify and defend academic and operating policies especially those having fiscal implications. And since total institutional performance is more of a factor influencing budgetmakers each year, virtually every aspect of an institution's operating policy from hiring and grading to salaries and the number of students graduating may be considered to have fiscal ramifications of one sort or another.

Events Leading to Current Heightened Concern about Institutional Performance

From approximately the period of Sputnik (1957) through the early 1970s, American education obtained a massive infusion of funding, support unprecedented in the history of this nation. Schools and colleges found themselves on the receiving end of a dollar pipeline whose source was

various government agencies and private foundations and whose treasuries, it appeared to many, were virtually bottomless. This was the era when, for the first time, the U.S. government moved toward large-scale financing of all sectors of education on a regular, on-going basis and in a myriad of areas which had hithertofore not received significant federal support or attention. As enrollments soared and the economy kept pace, educators discovered that obtaining increased annual budget allocations and gaining access to special funding categories were not difficult and billions were spent on a vast array of new programs. Proposals claiming to meet special needs, open up learning opportunities, add relevance, develop innovative approaches and, often, simply improve the general quality of education were drafted, endorsed and underwritten. Education also experienced a "boom" in construction as thousands of primary and secondary schools were built and expanded and new colleges founded including hundreds of two-year community colleges as well as many non-traditional "alternative" institutions. To many; bureaucrat, politician, foundation director, educator and average citizen, the classroom was looked upon as an almost ideal vehicle for providing the solutions to some of the country's most pressing problems. Financially, this was probably education's finest hour--its "Golden Age." "Golden" certainly in the sense that enormous support was showered on schools, colleges and universities, but also because growing enrollments led to an almost idyllic optimism about the future.

As the Vietnam War began to wind down in early 1973, education's "gold" began to lose some of its shine. More rapidly than many thought

possible, administrators found themselves, some for the first time, operating in an academic and economic climate which at marked variance with the previous decade and which forced them to confront the challenge of maintaining their institutions' health, vitality and accomplishments in a drastically altered setting characterized by inflation, static and shrinking revenues and other constraints. Unrestrained optimism about the future became increasingly difficult in stark contrast to the previous ten or twelve years when funding largesse and rapid expansion had been the hallmarks of the era.

Moreover, as the nation headed into the mid-1970s, academic administrators discovered that their problems were not all financial. More and more, education, especially higher education, found itself the target of a wide range of charges. Writers, legislators and voters, many disillusioned by much that had taken place during education's so-called "turmoil years," aimed their barbs at the nation's colleges. And while many of the tumultuous, sometimes violent, campus confrontations of that period took place over issues over which college leaders had little, if any, control--civil rights, the draft, Vietnam and an unpopular president--many felt that the educational establishment somehow bore a major share of the responsibility for these disruptions.

Contributing also to this legacy of mistrust was the disapproval by many of the government's use of schools and colleges, starting in the late 1950s, to enforce federal enactments designed to open up and extend learning and similar "quality of life" opportunities to minorities and others who were economically or educationally disadvantaged. To those not favoring the intent of such legislation, the dramatic and,

to some, radical changes in education and even in society in general which began in the early 1960s were, at least in part, also the fault of educators because of the role schools were given in this legislatively-mandated change process.[5]

By 1974, when the vice of severe recession and unemployment had begun to tighten its grip on the nation's economy, a mood of skepticism and questioning was clearly present in the minds of many citizens regarding America's educational system and its goals. Reports decrying institutional "results" appeared with increasing frequency on school committee agendas and at state and Congressional hearings. A relatively rare occurrence only a few years earlier, bonding issues for school construction and other educational purposes were rejected more often than approved by voters. The media harped about huge sums spent on special remedial programs during the 1960s and early 1970s. Surveys showed that many high school (and college) students could not write an elementary English composition or perform basic mathematical computations. Articles scoring grade inflation, reverse discrimination in admission decisions, social promotion, a dramatic dip in SAT results and striking facilities were published widely. Particularly criticized were the thousands of innovative and exemplary programs conducted during the previous era in an effort to meet special needs; programs which were often scuttled after large expenditures with little to show for results. And although unemployment at all age levels and in all stratas of the population was the greatest since the Depression, critics were quick to point out that among those who had spent two or four years in college, joblessness and underemployment were the highest in history. Publicity of this type did

little to strengthen the credibility of educators and education in the eyes of the public.

Still other factors in the early seventies led to education's descent from its earlier pinnacle of favor and support. A drastic reordering of public concerns brought about a nudging at first, then a vigorous pushing aside of education in terms of funding priorities as the struggle for a larger share of an increasingly limited number of dollars intensified among various interest groups. By 1975-76, a preoccupation with a severely depressed national economy, runaway inflation, an unprecedented energy crisis and, in particular, widespread unemployment had clearly emerged as the compelling legislative and taxpayer concerns of the land.

At this same time, a new and, for schools and colleges, ominous factor developed: the spector of retreating enrollments plainly visible on the immediate horizon. Since 1970, elementary school figures had been dropping steadily and forecasts called for secondary school populations to peak in 1978-79 with colleges receiving the full impact of the birth drop about 1983. Moreover, Department of Health, Education and Welfare figures predicted this downward trend would continue for several years before leveling off.[6]

Other reports were even less sanguine. Stephen Dresch, Director of Research in the Economics of Higher Education at Yale, estimated that between 1980 and 1990 undergraduate enrollments could shrink by as much as forty-six percent.[7] And according to findings published in 1976 by the National Center for Education, the total college population at public and private institutions, up 0.4 percent over a year earlier (two-year

schools increased 2.1 percent) would represent the last or next to last enrollment increase in higher education for the next decade or possibly fifteen years.[8]

Less quantifiable than population statistics, but also casting education in a difficult position were studies showing the college graduate of today pays more for an education, but earns less than in the past. One Harvard University report published in 1976 stated that for the first time in American history the earning power--in real dollars--of college graduates had dropped significantly.[9] In a related article, Spekke claimed that the rate of return on a college undergraduate education fell from eleven-twelve percent in 1969 to seven-eight percent in 1974. Equally sobering was the fact that while by the end of 1976 about 1.3 million people in the United States held undergraduate and advance college degrees (nearly double the figure of ten years earlier), during the same period the number of professional, managerial and technical jobs in the country grew by only about one-third. Published reports of this kind have done little to buttress the already tenuous position educators vis-à-vis those who control their pursestrings.[10]

Not all reports shared such gloom, however. As recently as 1976, the Carnegie Commission wrote that the passing of higher education's fiscal dilemmas appeared imminent. The Commission's prediction was based on an anticipated improved national economy, increased revenues and a decrease in welfare payments. But while it did state that, "Because of falling enrollments in primary schools, competition for tax funds for education will be reduced," the Report also conceded the uncertainty of accurately predicting economic conditions.[7] Paradoxically,

Slenny, in data provided in another report written for the same Commission, gave the warning that one-tenth of the nation's colleges and universities would go out of business, merge or undergo other radical changes by 1980. High attrition was cited as one of the prime reasons for these anticipated changes.[11] O'Brien cited a survey which indicated that half the colleges he polled expected that by 1980 their enrollments would increase by more than ten percent and the same percentage of those surveyed foresaw little or no increase in operating expenses between 1974 and 1980.[12] Likewise, the New York Times reported in June 1977 that the private sector of higher education, despite continuing fiscal problems, was holding its own.[13]

Such optimism notwithstanding, taking into account the upcoming dwindling numbers of college-age students, an inflationary spiral which does not appear to be abating and the possibility of a semi-permanent energy shortage with its attendant costs, such reports may have been, at best, somewhat naive. At any rate, given the fiscal realities of 1977 combined with new public priorities and a pervasive mood of skepticism about education in general, it would appear that academia's "Golden Age" is definitely over as both man-in-the-street and legislative budgetmaker alike seem to no longer subscribe to the once popularly-held proposition that the classroom is an ideal and potent remedy for much that is wrong with the nation.

Higher Education in 1977--Institutional Retrenchment a Fact of Life

Education has traditionally been a labor intensive industry--it spends more for employee services than it does on products and materials.

Until recently, colleges and universities were able to adjust faculty and other personnel salaries to offset rises in the cost of living through: (1) increasing tuitions, (2) obtaining higher budget allocations from their principle sources of support, (3) utilizing federal and other "soft monies," (4) using interest from endowments and investments. None of these options is nearly as "available" in 1977. Additional tuition hikes may well price colleges out of the market for their consumers; many states have revised their funding priorities and inflation is impacting on all legislative allocations; grant money to higher education has diminished considerably and institutional portfolios have decreased drastically in value due to depressed stock market prices as well as inflation. Colleges have found that it has become all but impossible to match recent large jumps in consumer prices. As a result, faculty and wages for higher education employees have generally lagged behind increases in the price level. Further contributing to the current institutional wage-price spiral has been the advance in the cost of contracted services, supplies and equipment, and in particular, the soaring costs of fuel and other energy.[14]

In 1976, Gov. Milliken of Michigan was quoted, when discussing the role of higher education in his state's upcoming "austere budget," as saying, "We are going to see constraints the likes of which you and I have not seen in this capitol."[15] On the lighter side, the Chronicle of Higher Education of July 26, 1976, focused on the dilemma of funding public higher education in a facetiously entitled article, "U. of Washington Stops Cutting Grass and Starts Cutting Vice-Presidents."[16]

An increasing number of public colleges and universities have adopted enrollment restrictions to defend their thinly stretched budgets against the pressure for increased admissions. Michigan State University, the University of North Carolina, and the University of Illinois enacted such rules in 1976 as part of a nationwide move being supported by many legislators to limit public higher education growth not only due to fiscal problems, but because of the forecasted downturn of applicants within the next few years.[17]

The experience of the City University of New York: an omen for the future? Probably no clearer example of the impact of fiscal exigency in higher education exists than the City University (System) of New York (CUNY). The combined issues of inflation, controversial admissions policies, changing enrollment patterns, racism, special student needs, and fundamental, often violent disagreements on priorities, all compounded by a massive city-wide money crisis. have generated spectacular problems for CUNY, the largest university in the world (270,000 students in 1976). As a result of New York City's flirtation with involvency, there is now concrete evidence of the devastating impact budgetary slashes can have on publicly-funded education. For example, in June 1975, the New York City Board of Education employed 72,959 teachers, supervisors, counselors and other staff at the primary and secondary levels. A year and a half later, in December of 1976, there were 57,038 employees in these same categories. Actual classroom teachers paid from city revenues declined from 56,623 to 43,630. Yet during this same 18-month period, the school population shifted only slightly--from 1,098,894 pupils to 1,095,290.[18]

However, it has been on the postsecondary level where the heaviest force of New York City's fiscal crisis has been felt and most visible. Cuts have been bone deep and sweeping with all signs pointing to further retrenchments. In an interview with the New York Times on July 25, 1976, City University Chancellor, Robert J. Kibbee, made several chilling predictions concerning the effect of budget deficits on his system's enrollments and staffing. One of Kibbee's primary concerns was the suggested (since implemented) imposition of tuition on CUNY matriculants.[19] He felt that the University could and would lose 35,000 fulltime students if tuitions were imposed and admissions requirements stiffened (e.g., elimination of open admissions) within the following three years. He further anticipated the need to drop 2,000 fulltime and 6,000 parttime faculty. The elimination of open admissions alone, the Chancellor felt, would have the greatest single effect, and he predicted that this factor coupled with tuition charges would bring about the immediate disappearance of 10,000 applicants, a quantum decrease even for a system of CUNY's magnitude. Stricter enrollment requirements and the charging of tuition did, in fact, bring about a severe drop of applicants in September 1976 with an even greater decline in the fall, 1977.[20]

While any discussion relating to CUNY's difficulties must obviously be considered in the context of New York City's overall fiscal woes, a review of educational budget decision-making trends in other areas of the nation suggests that the crisis facing CUNY may not be that unusual. Higher education periodicals in 1977 are replete with articles describing microcosmic CUNY-type situations simmering and flaring up nationwide.

Perhaps none is quite as serious or far-reaching as New York's, but for the institutions and students involved, each is potentially just as ominous as signs across the country appear to point to a continuing focus on education as a major target for mandating cost effectiveness and its corollary, retrenchment.

The Urban Community College: A Dual Clientele

The United States has been the first nation to freely accept the proposition that education beyond the secondary level should be made available to every citizen.[21] While such "availability" is still not universal, the burgeoning construction of two-year junior and community colleges between 1955 and 1974 moved this hope closer to reality. Such a commitment is a fairly recent and radical departure from the past when, in the case of many, especially private colleges, highly selective admissions criteria evolved over a period of years producing an annual pool of academically strong applicants. High entrance standards have also been the rule in many large state universities especially in the mid-west and far-west. Smaller and less prestigious schools developed their own measures but, by and large, before World War II, access to higher education was the exception, not the rule. On the other hand, the recent and rapid emergence of the public-supported community college meant that such schools had little or nothing in the way of historical precedents to shape their acceptance policies. At these colleges, enrollment practices must generally take into consideration the broader spectrum of academic abilities of an entire local populus rather than attempt to set up stringent selection criteria. Thus, while nationally,

admissions standards range from extremely rigid at a handful of select four-year schools to something close to pure open admissions at a few public institutions, most two-year colleges choose not to or cannot follow either extreme.

It would seem then that urban community colleges, more than their rural or suburban counterparts, would hold special promise to the widest range of potential matriculants. And in many ways, they do. They are one vehicle, perhaps the only vehicle, for offering realistic learning opportunities to many. And since often such schools eliminate many of the traditional barriers to higher education by charging little or no tuition, being less selective and frequently challenging popular notions about academic standards, advancement criteria and even basic definitions of failure and success, the city community college is especially attractive to the educationally and economically disadvantaged who may not have the means or the incentive to travel even short distances to outlying districts to obtain a college education.

Thus the emergence of community colleges as a major force in higher education in the 1970s has generated a new clientele of students who now seek low-cost postsecondary education in easily accessible locations in the hope that such experiences will lead them to better lives. Providing an opportunity for learning to these populations is, however, fraught with a network of interrelated problems particularly in a period of fiscal stress such as exists in 1977.

The special dilemma of inner-city colleges. Ironically, the crisis at CUNY and fiscal problems at many other inner-city two-year and four-year

public colleges may be attributed in some respects to their past successes in confronting two seemingly opposite academic objectives: (1) providing a college education for an (often) academically unprepared urban population and (2) offering high quality, academically rigorous programs to those who qualify. Because of this challenge, many city colleges and universities are finding themselves in a somewhat anomalous posture regarding these two goals. For while in a time of continuing erosion of their core cities, through their education, community and cultural programs, they have energetically and conscientiously striven to maintain high academic standards, their proximity to target area disadvantaged and low-achieving applicants, many of whom require extensive and costly support and remediation services, has concomitantly led them to the very dilemma they now face. For any metropolitan college, whatever its goals and no matter how altruistic its efforts to improve its responsiveness to the needs of the economically and educationally disadvantaged, must also uphold its attraction to the best qualified students through a broad, rigorous curriculum of traditional college-level subjects or risk sinking into a morass of mediocrity.

Most experts agree that as colleges retrench, more often than not, the impact of cuts weighs most heavily on the "new" or non-traditional student, that is, the student from socio-economic groups which historically have not sent their children on to college. In discussing the ramifications of CUNY's forecasted enrollment cutbacks at a 1976 meeting of the American Education Association's affiliate, the Council on Black America Affairs, it was claimed that while all aspiring students would suffer, blacks and other minorities would receive the brunt of the

CUNY retrenchments. Other comments at this same meeting reflected the feeling that since higher education does not seem to have the priorities it once did, the ultimate effect may be to go back to an elitist type of postsecondary institution, a trend already noted in California and Florida where legislators and politicians in their quest for economies have chosen to cut those programs offering compensatory education for the academically unprepared. 22

Of equal concern to those involved in technical education is the potential affect that severe fiscal exigency measures may have on occupational programs. Measuring the cost and cost effectiveness of occupational programs has been the subject of numerous studies. In general, findings have shown that training a student for a specific occupation in college is far more costly than preparing the general education or liberal arts students. Since the two factors usually identified as contributing most to this higher figure are the raised cost per student contact hour attributable to the lower level of utilization of facilities, instruction and equipment and the greater number of contact hours needed for technical training, any form of retrenchment will play the greatest havoc in vocational-type programs which, ironically, often lead to the best paying jobs for graduates.

To remain academically viable, the urban community college must not only attract and meet the needs of those who have not met with success in their earlier school careers but of all potential matriculants from within its geographic base including the academically talented. But providing even adequate learning opportunities for these two groups has become more complex and more costly each year. With resources to meet this

dual responsiblity diminishing and the cost of all programs rising, colleges often find themselves understaffed and severely hampered by over-extended counseling and remedial personnel, a rising student-faculty ratio and deteriorating classroom and laboratory facilities. Given these conditions, a large number of early leavers may not be an unreasonable expectation. And yet because of the renewed emphasis on institutional accountability, including attrition accountability, the higher the dropout rate, the more likely the charge a college is not living up to its potential, with negative budget reprecussions a distinct possibility. Thus, paradoxically, in times of severe fiscal exigency, a kind of Catch-22 dimension develops with schools like STCC finding they may be denied the very means needed to overcome the problems which are causing them to be fiscally penalized in the first place.

Springfield Technical Community College. Located in a downtown setting and possessing a strong occupational orientation of technical, health and business programs, Springfield Technical Community College has perhaps an even greater admissions challenge than most two-year city schools. As a state-supported institution with relatively low tuition ($300 per year), it is strategically situated in the midst of one of Springfield's most severely depressed areas (where both youth and adult unemployment is double that of the city as a whole) and, as a result, has become a beacon of sorts to many target area citizens seeking to improve their basic skills through remedial programs as well as to obtain specific job training credentials needed for employment. Concomitantly, as the

largest community college in the Commonwealth of Massachusetts and with a statewide reputation for career offerings (it is the only public two-year Massachusetts school incorporating the word "Technical" in its name), its over forty career programs, many of which maintain strict academic standards for admissions, draw students from all over Western Massachusetts and beyond. With an increasing number of educationally disadvantaged applicants from its predominantly low-income, disadvantaged neighborhoods coupled with those academically well prepared who seek entry to STCC's more rigorous programs, the varied intellectual abilities and competencies of its student body produce a true academic "melting pot."

In this respect and in response to the expanding focus on key urban and social problems, STCC feels it has made unusual achievements through its educational, community and cultural programs. The college has become, in effect, a magnet--an integrated community college bringing suburban matriculants back into the core area while expanding its services to center-city minority and other disadvantaged students. And yet while STCC feels it has made measurable progress in meeting these diverse challenges up to this point, the high cost of offering such specialized programs in a climate of severe fiscal constraint has become increasingly difficult.

Moreover, all signs indicate a continuing growth trend of low-income, educationally disadvantaged students attending STCC. In the fall, 1976, STCC had nearly eighteen percent of its enrollment from minority groups, the highest proportion of the fifteen-member community college system with

the exception of Roxbury. Additionally, a significant proportion of entering students at the college are both educationally and economically disadvantaged. For example:

-- In 1973, one-third of all students were members of families (parents or student heads of household) earning less than $7,500 (median) annually. By 1976, this percentage had grown to forty-five percent.

-- In 1976, one-third of STCC's day students earned less than $250 annually.

-- In 1976, one-third of entering students scored 350 points or less on their verbal SATs.[23]

Furthermore, in the same year over forty percent of the entering matriculants could not even meet STCC's minimum college entrance competencies in mathematics and reading, such students requiring special services and developmental/remedial assistance as a condition of acceptance. This proportion had grown by an average of five percent in each of the past several years reflecting the increasing matriculation of academically unprepared men and women. Thus, it can be assumed that by 1977-78, or, at the latest, by 1979, more than one out of every two first-time students at the college will be deficient by the school's minimum standards in math, English, or both.

Definitions.[24]

Attrition. A precise definition or classification of attrition is clearly essential to any dropout study but is a matter which has given researchers serious problems over the years. The major difficulty has

been the temporariness of the status of a given student leaver since, in theory, any dropout can go back to college at any point in time to complete his or her degree requirements. What initially appears to be a simple matter becomes a problem of choosing a definition unhedged by qualifying conditions, exceptions, time constraints and the like. A standard definition of attrition such as, "The incidence of students who leave college and do not graduate at the specific time designated for their entering class to complete its studies," is probably excessively broad in that it fails to distinguish between successful persisters and those who drop out and return later on. It also excludes those who eventually succeed without leaving but take a longer time to complete their studies than their fellow matriculants. Likewise, in a more abstract sense, this definition may be too narrow in that it disregards, for all intents and purposes, those talented individuals who never attend college at all. Nor does it address those who graduate on schedule but whose intellectual and psychological growth is never stimulated in college and whose performances, therefore, fall far below their capacity. Further compounding the problem of definition is the recent and growing phenomenon of vast numbers of students of traditional college age as well as older men and women who obtain degrees outside of the regular two-year and four-year timeframes by attending classes on weekends, in the evening, or intermittently parttime and fulltime thereby spreading their academic careers over an extended period of time.

In his definitive book on attrition, Preventing Students from Dropping Out, Astin coped with this problem by identifying three rather than the usual two categories of students: those who did not drop

out, those who clearly did, and a third group who interrupted their studies but who, the author felt, had a reasonable chance of obtaining their degrees in the near future based on data obtained from a longitudinal survey he conducted. While Astin's definition effectively removed much of the ambiguity connected with classifying dropouts, it can be used only if data on students' long-term academic aspirations are available, material Astin gathered as part of his research activity. Clearly such an approach is more difficult to adopt in, for example, a two-year institution where many students have not crystallized their thinking about their futures at the time they matriculate.[25]

The definition of attrition used for this study is:

> The incidence of students who, after enrolling in a technical, health, or business division at STCC, do not graduate within the one or two year period designated by the college as needed to complete their programs.

Open Door. STCC does not have a pure "open door" policy in the sense that any person (or number of persons) can enter the institution to pursue whatever program he or she wishes. The college's "open door" as described in its catalog is as follows: "STCC has an 'Open Door'" which means the college maintains an admissions policy allowing, within the limits of its budget and certain academic requirements for individaul programs, any high school graduate to enter the college as a fulltime day student."[26] It is obvious that the stated "conditions" substantially alter the spirit of a pure "open door" in the respect that they impose definite limits of acceptance. Nevertheless, the principle of the "open door" policy is ascribed to, in principle at least, by STCC and the Massachusetts Regional Community College System.

Limitations to Study

This study is designed to deal with the attrition performance of STCC's career students and career divisions and departments proposing only policies of intervention to improve student retention in those specific areas. Strategies for overall institutional economies are not intended or included.

The paper's focus on the costs and complexities of offering large-scale remedial and developmental programs to the educationally disadvantaged is limited to STCC's commitment to maintain a balance between these services and its regular career offerings in a period of financial stress.

No examination of the college's institutional mission is intended nor is a follow-up of students about whom data were collected.

Finally, a description or exploration of potential funding sources does not come within the purview of this project. Rather its fiscal implications are limited solely to the potential favorable impact an improved student retention rate might have on the school's ability to continue obtaining its regular budget allocations plus attract new sources of institutional revenues.

Organization of Study

This study is composed of five sections: an introduction to the problem, a review of the literature, a description of the methodological approach used, an analysis of results and a final chapter containing a summary of findings, conclusions and recommendations.

Chapter I. A statement of the research problem and the justification of the study are followed by a discussion of the factors leading to the current emphasis on institutional performance in higher education. The current trend toward severe retrenchment practices in education is described with the experience of the City University of New York (CUNY) cited as a possible harbinger of things to come. The problem of the dual clientele of many urban colleges is analyzed and is related to Springfield Technical Community College. Relevant definitions and the limitations to the study complete the chapter.

Chapter II. A brief history of attrition research and the reasons for the existence of this body of literature are given. This is followed by a discussion of various attrition writings with particular focus on those studies dealing with environmental factors as they relate to the dropout.

Chapter III. In this section a description of attrition, the various attrition categories employed in the study and the student sample are presented. Details regarding the selection of various student and institutional variables are explained. The chapter concludes with a discussion of various forms of analysis selected to examine student and college characteristics.

Chapter IV. This section includes a detailed analysis of the data collected, a detailed explanation of the results obtained from an examination of the total student sample and student, division and department characteristics as well as the various discriminant analyses performed on the data.

Chapter V. A summary of findings and conclusions, recommendations and suggestions for needed research comprise the final chapter.

CHAPTER II

REVIEW OF LITERATURE

Events Leading to the History of a Literature on Dropouts

In his interpretive analysis of the dropout problem, Angus discusses some of the major movements which have played a role in the emergence of a distinct and sizeable body of secondary school and college attrition literature. Historically, until recently, the rationale for conducting most dropout research was the claim that staying in school impacted positively on future employment and social mobility. Down through the years, controversies and reform movements centering on this contention have spawned hundreds of studies supporting or rebutting the premise. In the early 1900s, child labor reformers argued that the prime reason for school withdrawal was dissatisfaction with curriculum while employers of children held it was poverty. Just prior to World War I, the federal government, which had previously been concerned with the causes of attrition, shifted its focus to its economic consequences; this change culminated, in the eyes of many, in a national educational system which had many of the earmarks of a handmaiden to industry. The Crash of 1929 and ensuing Depression forced a re-examination of the government's position since enrollments remained high in this period but so did unemployment, especially among youth from low-income families. It was at this point that many researchers began to examine attrition data by correlating pupil characteristics with academic performance; this approach characterizing most of the research to this day. (Prior to

the 1930s, the majority of studies tended to emphasize the broader economic or philosophical ramifications of leaving school early rather than performing detailed analyses of dropouts themselves.) During all these periods, including after the manpower crisis of World War II, the government sponsored stay-in-school drives, often with questionable results. The adoption of the GI Bill is credited as being the single greatest impetus (up to that time) to something approaching universal postsecondary training and shortly after World War II college attrition studies began to equal, for the first time, research on high school dropouts. The launching of Sputnik turned the focus temporarily to the academically talented and away from the dropout, but the eventual relaxing of Cold War tensions and a shift of domestic problems ultimately caused the government, once again, to increase its concern for attrition because of the supposed economic drawbacks of withdrawing from school. The implementation of Civil Rights legislation moved the justification for studying early leavers away from claimed future employment benefits of staying in school toward a more ideological stance which suggested attrition should be reduced simply because all persons have a basic inalienable "right" to succeed academically. Finally, the emergence of nationwide community college system beginning in the late 1950s added to this ideological thrust, particularly in view of the large number of non-traditional students enrolled in two-year colleges.[27]

While this researcher has found that this rationale--one's "right" to succeed in school or college--has remained the major premise on which much of the current attrition literature is predicated, articles in the popular press seem to point to a trend reverting back once more to the

historic proposition that examining student data and proposing solutions to improve retention rates are necessary because a large number of non-persisters is "bad" for the nation as a whole (e.g., leads to large scale unemployment and other social problems). This rationale, however, is not evident in most major research sources such as dissertations and journals.

Types of Attrition Literature

Hammond separates dropout research into six broad categories:

1. Census studies which attempt to document the magnitude of attrition within and across institutions.
2. Studies which seek self-reported reasons (by students) for leaving school.
3. Case studies which generally involve long-term follow-up of students initially regarded as dropout risks at the time of admission.
4. Studies which utilize a range of admission variables to generate prediction equations of the potential for "success" in college.
5. Philosophical or theoretical studies which usually include recommendations for action based on the assumption that dropping out should be prevented.
6. Descriptive studies which describe the characteristics of the dropout, how he/she lives, studies, etc.

Hammond concluded that most past investigations of college attrition focused on five basic variables: age, sex, ability, socio-economic background,

and personality and stated that, in his opinion, most yielded inconclusive results.[28] (This finding was confirmed by the investigator.)

An analysis of the representative works of four major educational philosophies relative to their provision for dropouts was performed by Partridge. In his study of essentialism, social realism, experimentalism-reconstructionism and neo-Thomism, he suggests that no single philosophy or writer (among them Dewey, Hutchins, Conant, Adler and others) was appraised as adequate for the dropout's educational experience since none provided for either individual personality development or individual social relationships.[29]

A recent trend in attrition research: an effort to improve the prediction of academic success in college by the addition of non-intellective variables to cognitive predictors is described by Aiken. He found that variable studies alone or in combination with congitive predictors have included personality variables (e.g., Grace 1957 ; Faunce 1960); motivational factors (e.g., Aiken 1964 ; Read 1968); biographical characteristics (e.g., Astin 1964) and the interaction of characteristics of the individual and the characteristics of the environment (e.g., Astin 1964 ; Newman 1965 and Nasatir 1963). In all these studies, the non-intellective variables were generated through survey instruments filled out by students.

Kubiniec added another variable to the non-cognitive domain: that of self concept which she defined as representing the individual's general attitude toward himself/herself. Her hypothesis was the self-concept is presumed to be more global than specific personality traits and, hence, has more potential for improving the prediction of academic success.

While, in general, the Kubiniec study supported the prediction value of the self-concept theory, results were, according to the author, somewhat conflicting due to the many operational definitions of self-concept.[30]

The rise of open admissions has prompted numerous studies aimed at comparing the success of those students enrolled under traditional (past performance) rules and those matriculating through the "open door." In examining the termination among traditionally and non-traditionally accepted students at CUNY, Berg's major finding was that family support (approval) is the most significant factor leading to persistence. Among his other results was the finding that while the operationalizing of an open admission policy caused some minor discontent among traditional students, it had no measurable effect on their persistence. Another conclusion was that for the non-traditional student, academic advisement was a crucial factor in success. Citing the increasing number of college programs admitting students who previously would not have gone to college, Berg suggested additional studies on the impact of these more flexible admissions policies.[31]

Did they leave for the best of reasons? was the rhetorical title of Colozzi's study of persisters and dropouts at the Borough of Manhattan Community College. His study, which also included both traditional and non-traditional matriculants under CUNY's "open door" policy, found that the most significant factor leading to persistence in both categories was student expectations; students of both groups who had well-defined goals tended to remain in school.[32]

Institutional envionment as a factor in attrition. But what really is known about the early college leaver? The literature is vast and continues to grow rapidly forcing the serious researcher not only into a selective review but, more important perhaps, into a more discriminating choice of contributing factors and influences to be studied. Between 1960 and 1970, at least six in-depth reviews of the literature of college dropouts were published: Knoell (1960, 1966), March (1966), Specton (1965), Summerskill (1962), Waller (1964). Knoell herself suggests that college dropout studies may soon rival college predictions studies in sheer numbers and Summerskill made the point (in 1962) that research on college dropouts had a history of at least forty years and the attrition rate had not changed appreciably during that period. Spady stated that despite the plethora of research, college dropouts still actually outnumber non-dropouts with only about forty percent of the nation's students graduating on the date scheduled for the class in which they matriculated.

Research to date has tended to be microcosmic rather than macrocosmic and the literature is filled with what Knoell calls "autopsy studies" in which dropouts are queried about their reasons for withdrawing. Many attrition experts suggest that researchers should devote increased attention to the institutional environment as a potentially more valuable variable than concentrating on further follow-up studies of those who failed; studies which are frequently replete with conclusions often drawn from students' personal perceptions. Indeed, the most articulate and perhaps most severe critic of our present educational institutions, Paul Goodman, places the blame for dropouts and student alienation squarely in the laps of the schools themselves, specifically educational

administrators. Goodman feels that students' disenchantment with schools does not necessarily center on lack of ability of students to adapt to the schools, but rather in the schools' inability to adapt to the pupils' special needs.

In what may have been the most exhaustive critical analysis of the problems of dropping out up to that time (1958), Blough examined a bibliography of 476 cited references and 325 supplemental references dating from 1872. He arrived at 41 factors associated with students leaving school early which he collapsed into eight major categories. It is interesting to note that schools themselves, as the locus where knowledge is ostensibly imparted, were not among these eight categorized factors cited as bearing on persistence. While Blough's report dealt primarily with the secondary school sector, the review of literature conducted by this investigator confirmed that a similar situation prevails in most college attrition research; the use of variables relating to an institution's physical and academic potential to increase learning--specifically variables such as classroom and laboratory facilities, student-faculty ratios, academic credentials, and the like--are not common in studies analyzing attrition performance in higher education.

Turner addressed, then skirted, this issue by questioning the use of student-generated data in studies about institutional environments but concluded by suggesting a closer articulation between colleges and secondary schools as the most important initial step toward decreasing dropout rates.

While attrition studies of the institutional environment (often labeled the environmental "press") do exist, they are relatively

recent development in academic research, the majority having been conducted during the past decade, and they remain a distinct minority among dropout studies. Feldman broke them down into six basic approaches:

1. Anthropological vignette--actual student case studies relating to students' perceptions of their institutions based on their college experience.
2. Conventional classification--type of school (liberal arts, technical, etc.) geographic location, etc.
3. Attributes of students--average test scores, average IQ's, etc.
4. Demographics--size of enrollment, operating budget, library, etc.
5. Social, structural and organizational dimensions--types of control, institutional patterns of college.
6. "Climate of college"--aggregated perceptions of students in college.

Since the overall environment or "press" of an institution, no matter how measured, plays probably the major role in determining which students go where, the college attended by the student (which is equivalent to saying the general environment in which he/she is placed) obviously affects to a greater or lesser degree, the general outcome of his/her college stay. In this respect, Feldman notes the relationship between these six approaches to attrition. But beyond this connection, such studies have usually not been designed to address the influence of both the classroom environment and selection criteria on success or non-success in college.

Astin, frequently cited as the preeminent attrition researcher of the 1970s, defines the college environment as

> Identifying and measuring those institutional characteristics which are likely to have some impact on the student's development including any characteristics which constitutes potential stimulus for the student.[33]

Four major measures of the college environment have been developed. The first systematic empirical approach is the College Characteristic Index (CCI) which is based on the notion that the college environment can be characterized in terms of its potential for reinforcing certain personality needs. Observers (almost always students) are asked to give their impressions of some 330 items describing different aspects of the college climate. The second measure is the College and University Environment Scales (CUES), similar in approach to the CCI but using different scoring methods. Astin and Holland produced a somewhat different instrument for analyzing institutions--the Environment Assessment Technique (EAT) which is based on the assumption that environments are transmitted by people and college environments depend on the personal characteristics of the entire college "family." The fourth method is a specially designed instrument called the Inventory of College Activities (ICA) which emphasizes the various "stimuli" which students' actions produce on others, that is any behavior, event or other observable characteristic of the institution which is capable of changing the student's sensory input.

A problem inherent in all four approaches, although somewhat less in the ICA, is the college "image" aspect of the instrument used. That is, data are usually generated through questionnaires completed by

undergraduates themselves, with all four methodologies examining students' perceptions of the environmental press.

Feldman, noting that the CCI, CUES, EAT and ICA rely primarily on student images, used Path analysis to determine institutional environment but found that the complexity of phenomon, the variety of possible approaches and other conceptual and methodological difficulties pose problems of great complexity to the researcher.[34]

Other than indirectly or casually, none of the above approaches has been used to directly correlate institutional classroom characteristics in attrition performance. Thus, the problem of which variables or which environmental study approach to use (and how to study them) has proven to be a difficult one. In a very traditional study which produced only inconclusive results, Gum described just one of the problems which researchers of attrition face. He noted that despite all the studies which have been conducted on dropouts, one aspect of a college--its institutional grading standards--may impact on attrition as much as any other policy or student characteristic. To prove his point, he posed the hypothetical question: Do the variables which account for large differences in performance influence attrition if performance levels are held constant? In other words, does a variable such as verbal aptitude influence persistence in college only because of its well-documented relationship with academic achievement or do dropouts have lower verbal aptitude regardless of the grades they receive?[35] Unwittingly perhaps, this investigator feels, Gum may have precisely captured the historic dilemma of the attrition researcher.

C H A P T E R I I I

METHODOLOGY

Background to Methodology Employed

A review of the literature indicates that, for the purposes of comparison and analysis, attrition researchers most frequently have focused on student variables alone or student variables jointly with certain institutional attributes such as size of school, religious affiliation, co-education, residential facilities, location, academic philosophies, athletic policies, costs or similar related factors. And yet, despite the development of a distinct body of research on the problem of the early leaver dating from before the turn of this century and the myriad of institutional and student variables studied, the dropout rate in colleges has not decreased appreciably in more than forty years.

It is the contention of this investigator that measures relating more directly to the actual learning environment, that is, the classroom itself, combined with information pertaining to an institution's admissions practices may yield more meaningful and useful results in terms of tracking dropout patterns and eventually improving student persistence. It is suggested that certain elements may impinge most directly and most frequently upon a school's capability to impart knowledge namely faculty credentials, laboratory faciliites, student-faculty ratios, professional salaries and the like and may well be powereful variables for analyzing past student performance leading to a

superior method of charting students' academic potential. It is further suggested that obtaining data on these factors from official academic records and from professional administrators may be an effective means of eliminating the possible bias present when such information is gathered through the use of student-answered surveys; the latter having been the traditional method employed by most researchers to obtain data about the actual classroom environment.

The purpose of this chapter is to describe in detail the procedures applied in the identifying, gathering and analyzing of such admissions and classroom data and the reasons for using the methodological procedures selected. The first part of the chapter defines attrition and describes how attrition categories were developed. Next appears a description of the sample of students used. Following this is an examination of the student and classroom variables related to attrition. Finally, the methods of exploration of the variables are described. In this final section, attrition is explored by three methods. The first two sets of analyses related to attrition based on student variables. These were examined overall for the total student sample and then explored individually for the three major career divisions at STCC: technical, health, and business. The third set of analyses explored the institutional charateristics which were obtained for all departments.

Description of Attrition and Evolving Attrition Categories

Attrition: Definition. Attrition is defined as the incidence of students who, after enrolling at STCC, did not graduate within the one

or two year period designated by the college as required to complete their programs.

Attrition categories. The first step in exploring attrition was to classify all designated matriculants into fifteen categories relative to their attrition history:

1. Dropout--dismissed by STCC for academic reasons.
2. Successful Persister--graduated on time with G.P.A. 2.7 or better.
3. Marginal Persister--graduated on time with G.P.A. under 2.7.
4. Successful Late Finisher--graduated late with G.P.A. 2.7 or better.
5. Marginal Late Finisher--graduated late with G.P.A. under 2.7.
6. Successful Returnee Late Finisher--missed a semester or more, returned and graduated late with G.P.A. 2.7 or better.
7. Marginal Returnee Late Finisher--missed a semester or more, returned and graduated late with G.P.A. under 2.7.
8. Defaulter--dropped out during first semester; no G.P.A.
9. Successful Stopout--dropped out with G.P.A. 2.7 or better.
10. Marginal Stopout--dropped out with G.P.A. under 2.7.
11. Successful Non-finisher--did not graduate by 8/76; had G.P.A. 2.7 or better.
12. Marginal Non-finisher--did not graduate by 8/76; had G.P.A. under 2.7.
13. Successful Returnee Non-finisher--missed one or more semesters, returned but did not graduate by 8/76; had G.P.A. 2.7 or better.

14. Marginal Returnee Non-finisher--missed one or more semesters, returned but did not graduate by 8/76; had G.P.A. under 2.7.
15. Transfer--began a career program but at some point during his/her stay, left his/her initial program choice and matriculated in another program.

A detailed exploration of the fifteen categories was then performed. Because of the small numbers of students in some categories, it was recognized that using all fifteen classifications would, in many cases, provide results of little statistical value and, in certain instances, data which would be virtually meaningless. Since the basic purpose of the study was to determine if starters became finishers, it was decided to consolidate the marginal and successful sub-groups. Moreover, further examination of the descriptive analysis showed that all members of the two returnee sub-groups would, in fact, eventually end up in another category by the study's termination date. Since the researcher was less interested in whether or not students left and then returned, but rather if they either dropped out permanently or ultimately completed their programs, returnees were placed in that category which their records indicated they would belong in by the termination date of the study. Preliminary analysis of the fifteen categories by various student characteristics gave supportive evidence for collapsing into fewer groups.

Of the total number of students comprising the original sample, 554 constituted internal transfers: students who began a career program at STCC but who, at some point during their stay in college, left their initial program choice and matriculated in another program. Since the method used to classify students into attrition categories was based upon

dates enrolled and the number of semesters in which grades were received, most students who transferred internally to another department would be classified as non-finishers if their first department was considered, or late-finishers with respect to their second department. Since neither category sufficiently reflected college attrition (but rather only departmental attrition), and since there was no rational basis for determining the category on either the first or second department, the researcher selected to delete transfer students from the remainder of analyses.

Following deletion of internal transfers, the remaining fourteen attrition sub-groups were collapsed into six separate attrition categories. The investigator believes these six groups represent the major persistence and withdrawal patterns at the college. These categories were defined as follows:

1. Dropout--a student who was dismissed by the college for academic failure.
2. Persister--a fulltime day student who graduated at the time scheduled for student's class to complete its regular courses within the prescribed two or four semesters. This student did not take any required subjects outside of the regular scheduled daytime semesters.
3. Finisher--a student who graduated before the August, 1976 termination date set for the study. In addition to attending classes during the prescribed fulltime two or four semester day program period, student attended school in a summer, evening or interim semester or extended his/her studies beyond

the two or four semesters normally needed to graduate. This group included students who may have dropped out of school but who returned to complete their programs before August 1976.

(Although these two categories, persisters and finishers, were analyzed separately, they are also referred to jointly in this study as completers. This is in line with the researchers primary focus for the study, namely to compare those who completed their programs, regardless of how or when they finished, with those who did not finish, were dismissed, or left of their own accord.)

4. Defaulter--a student who dropped out during the first semester before receiving grades (up to the first thirteen weeks of the semester).
5. Stopout--a student who dropped out after successfully completing the first semester.
6. Non-finisher--a student who did not graduate by the August 1976 cutoff date for the study. Student may have left college temporarily but did return to his/her original program before the study's deadline.

Student sample. The sample employed in this study included all matriculants who applied for fulltime status, were accepted, and paid their fees and tuition to enter the first semester of a technical, health or business program at Springfield Technical Community College in September 1973 or September 1974.

Student information was collected from two sources. Data on sex of student, veteran status, high school rank, age and marital status were available in the college computer data bank. The variables: economic independency/dependency and socio-economic status were abstracted through an individual review of student folders.

The total number of technical, health or business students comprising the original study sample was 2387. With the deletion of the 554 transfer students, the total number of students whose academic records were used to ascertain their attrition history for this study was 1833.

Limitations of the sample. The total number of fulltime day students enrolled at STCC in September 1973 was 3108. Total enrollment in September 1974 was 3341.

Since the purpose of this analysis was to examine only students matriculating in career programs during the time periods set for the study, students from the following divisions, departments, sections and categories were not included:

-- Technical, health and business divisions--other than September enrollees
-- General studies
-- Liberal arts
-- Student development
-- Summer and evening students
-- Summer, evening and interim-semester--other than September 1973 and September 1974 fulltime daytime matriculants who may have taken a course(s) in these sections

-- CETA and other non-credit courses

-- Special veterans' courses and programs

-- Remediation programs

-- Seminars and conferences

-- Any other program not requiring fulltime, daytime attendance

Number of students studied. Table 1 displays the number and percent of students in each of the three career divisions.

TABLE 1

NUMBER OF STUDENTS BY DIVISION

	Technical	Health	Business	Totals
Students	751	490	592	1833
Percentage	41.0	26.7	32.3	100.0

Description of Attrition in Terms of Student Characteristics

Student Characteristics. Seven student characteristics were used in this study: sex, marital status, socio-economic status, high school rank, veteran, economic independency/dependency and age. These seven represented, in effect, the major informational data recorded and available on the admissions applications of those men and women comprising the student sample.

Family or personal income data were not requested on student applications in 1973 and 1974. Such information pertaining to student finances has long been recognized and accepted as an important variable

for use in college dropout studies. Therefore, it was decided to include that information which was available on student applications and which represented at least a general indication of students' socio-economic status, namely, the occupation of head of household (usually a parent) for dependent students and occupation of student when applicant was independent.

Neither the Scholastic Aptitude Test nor any other placement examination was required for entering students at the time of this study. In view of this, high school rank, as indicated on individual transcripts, was used as evidence of prior academic achievement.

Additional details and specific procedures employed in formulating individual student variables are provided in the description of each characteristic.

Sex of student. Data on this characteristic were available for all students in the computerized student records.

Marital status. Information on marital status on the 1973 and 1974 student applications included only two classifications: single and married. A recent survey by the STCC Financial Aid Office showed that approximately ten percent of the school's aid recipients were divorced, separated or widowed. However, the paucity of data available at the time of the study precluded the inclusion of these additional classifications for this analysis.

Socio-economic status. While it is generally conceded that student or family income is a superior measure for analysis in attrition studies, a lack of data on student finances precluded that use of this varaible.

However, the researcher considered it imperative to structure some method of generating information to at least broadly classify students in respect to this characteristic. This was considered especially important in view of the fact that it has long been assumed that STCC draws a significant portion of its enrollments from students of limited financial resources.

An extensive examination of census studies, employment reports and labor surveys failed to develop a stratified (by income, economic status or both) listing of employment categories suitable for use in this study. The problem was twofold: finding the right model which would accurately reflect the diversity of jobs which were listed on student applications as held by the head of household or the independent student and extrapolating from these jobs accurate salary figures. A solution was provided by conducting a review of individual student folders of the entire study sample from which over 325 occupation classes emerged ranging from unemployed and in prison to surgeon and bank president. The researcher in turn consolidated these occupations into ten employment groups broadly reflecting varying job classifications. For consistency, in those cases where students listed both parents' occupations, only that job held by the head of household was used.

To determine socio-economic status, a decile rank was assigned to each major group: one (1) equaling employment on the lower end of the socio-economic scale and ten (10) signifying the most prestigious (and well-paying) occupations. The scale used is given in Table 2.

TABLE 2

Socio-Economic Classification	Typical Occupations
1. All others	
2. Government assistance recipient	Disabled, AFDC, welfare, ward of state, unemployed
3. Service employee	Waitress, sales clerk, bartender, cashier, postal clerk, bus driver, lunchroom or health aid
4. Labor (unskilled)	Janitor, truck driver, factory laborer, farm worker
5. Tradesman, technician, small farm owner	Railroad engineer, foreman, machinist, inspector, meatcutter, skilled construction worker
6. White collar, small business owner	Office worker, key puncher, telephone operator
7. Owner & manager or mid-level employee of middle-size business	Department head, salesman (other than small firm) purchasing agent, programmer
8. Government, health services employee	IRS agent, librarian, teacher, nurse, police, fire employee, dental hygienist
9. Executive	Owner or manager of large business, high government official, airline pilot
10. Professional	Physician, lawyer, dentist, engineer, chemist

High school rank. Along with standardized test scores, high school rank has long been acknowledged as a valid measure of demonstrated academic ability when evaluating potential for post-secondary success. However, judging the probability for success in college through the use of high school rank is complicated by two related factors. The first is the need to discriminate between those students who take less rigorous

courses in secondary school and who, therefore, may receive better grades and thus higher class standings upon graduation than their possibly brighter classmates who pursue more demanding programs with more competitive grading policies. Secondly, it is generally conceded that various factors, not always subject to exact measurement, often operate within a given high school which impinge directly (or indirectly) upon the overall academic "reputation" of that school in the eyes of college admissions officers. This has been known to result in a system in which those making college selection decisions tend to rate the academic "worth" of a given high school's designated ranks as being greater or less than identical ranks supplied by other schools.

To compensate for these differing perceptions, the researcher had originally intended to use a weighted formula designed to allow for known differences in high school rankings. However, discussion with the former STCC Director of Admissions as well as admissions officers at eight other Massachusetts community colleges and the University of Massachusetts revealed that the use of such formulas in the past has not been especially successful; the problem having been one of too many subjective variables making up the equation.

Both the former and current Directors of Admissions at STCC advised the researcher that, based on their experiences, they tended to accept the high school rank indicated on an applicant's secondary school transcript as generally coming reasonably close to reflecting the applicant's actual ability regardless of the high school courses pursued or the scholastic "reputation" of the sending institution. Both cautioned, however, that they also scrutinize the type of courses taken in high

school before arriving at a judgement regarding a candidate's chances for success in the particular STCC career program requested. Moreover, they added that, in their opinion, the quality of the sending high school is probably of less importance in community college selection procedures than might be the case of admissions decisions at most four-year colleges.

For this study, high school ranks were used exactly as recorded on the transcript. These in turn were translated into deciles ranging from one (1) for the upper ten percent of a graduating class to ten (10) indicating that applicant was in the bottom tenth of the class. For those students for whom no high school ranks were available (e.g., GED recipients, some older students, others whose scales had been omitted), a rank was used based on the median score of the total sample studied.

Veteran status. All students who were veterans were listed on student records.

Economic independency/dependency status. In addition to seeking data on students' socio-economic status, it was considered desirable to know whether or not students were self-supporting or dependent on their families. Two categories were developed.

-- Independency--students assigned to this category included all veterans, married students, those twenty-one years of age or older and students who listed a home address other than their parents' as their permanent residence.
-- Dependency--all other students in the sample were considered financially dependent.

Age. Age, in years, was calculated (as of the cutoff date of the study) from dates of birth in student records. Where this information was missing, the median age of the student sample was used.

Classroom and other departmental characteristics. Information pertaining to classroom characteristics was developed to identify those variables believed to be significant in determining student performance and withdrawal patterns. Data was obtained through discussion with the former Deans of Faculty and Administration and the former Director of Admissions, each of whom was in office at the time selected for this study, and from other administrators and staff including division and department heads. Other sources consulted were the STCC HEGIS Reports of 1973-74 and 1974-75, salary schedules, physical plant plans, laboratory maintenance reports, enrollment statistics, and departmental records.

Data on the following six institutional characteristics were collected for each department: faculty salaries, academic credentials, student demand for program, admissions criteria, facilities, and student-faculty ratios. Further information on the manner in which each institutional characteristic was formulated is included in the detailed description of each variable.

Faculty salaries. While the premise which correlates instructional excellence to faculty pay is open to wide discussion, this investigator suggests that in view of inflation and the rising emphasis in academic circles on the issue of equitable wages, this factor may play a telling role in the quality (or lack of same) of classroom instruction;

that, considered in the aggregate with other institutional characteristics, faculty remuneration may be an important ingredient in the compositon of STCC's total teaching capability and, as such, significant in a study designed to correlate attrition with the actual institutional learning setting (e.g., the classroom).

Information on staff salaries was obtained from faculty payroll records and was collected only on those persons who taught occupational subjects. Since faculty who offer courses in the humanities and social and natural sciences do so on an interdepartmental basis across the institution, their wages were not included in the development of this variable.

The method of abstracting developmental salary scales involved placing all occupational faculty wages on a matrix, lowest pay to highest. These were then broken down into five groups. When, as usually happened, faculty from the same department fell into different groups, an average salary for the total department staff was computed with that department's pay level, for the purposes of this study, being assigned to that category which included the computed average.

The following portrays the salary ranges in each group. Salary levels were ranked on a scale of one (low salary) to five (high salary).

Group 1	$10,299 and under
Group 2	10,300 to 13,500
Group 3	13,501 to 16,000
Group 4	16,001 to 19,400
Group 5	19,401 and above

Academic credentials. Taken by themselves, the number and levels of degrees attained by a group of faculty members may be disputed as a valid gauge by which to measure a department's potential for instructional excellence. However, few would disagree that academic credentials do provide some indication of the experience, goals and motivation of professional educators. Therefore, this researcher contends that, considered jointly with other departmental characteristics, the total faculty academic achievement of a department may be an important element in the overall ability of that department to develop a classroom climate conducive to learning and, in this manner, relate directly to the attrition performance of its students.

In a technical college, particularly one with vocational school antecedents such as STCC, faculty often bring with them invaluable experience in the private sector as part of their preparation for a teaching career. An examination of faculty vitae revealed that every teacher evaluated in developing this variable had such prior employment in medical, industrial or business fields. Due to the inherent difficulty of placing a precise value on the worth of these experiences, such non-academic credentials were not used in formulating this variable but rather were considered a given since private employment was a universal trait among all faculty included in the development of this characteristic.

This variable was designed to measure academic credentials by division and department in terms of the highest degrees obtained rather than on a quantitative basis. In this manner, departments with larger

staffs did not artificially raise the ranking order used in evaulating credentials.

The scale for measuring academic credentials ranged from one (1)--lowest level of academic achievement--to five (5)--highest level attained.

Group 1	Associate Degree
Group 2	Bachelor's Degree
Group 3	Bachelor's and Master's Degree
Group 4	Master's Degree
Group 5	Doctoral Degree

Demand for program (number of openings compared to number of eligible applicants). Few would deny that the more candidates for a limited number of class slots, the more selective selection procedures tend to become. However, in a technical school, because of the high cost of instruction, another important factor may be the number of persons applying for entrance to a department related to the number of actual openings it has available. The contention here is that a department may have a greater or lesser number of spaces and depending on how much demand there is for that program, the instructional approach, departmental effectiveness and, ultimately the performance of its enrollees may be influenced by this demand.

Each department was judged on the number of applicants applying for entry at the time of the study. Department heads and the former

Admissions Director together placed individual departments on a scale ranging from open admission (low) to relatively few openings (high). In all cases, only applicants who were eligible for entry to a given department were counted.

Criteria rankings for this variables were scaled as follows:

Group 1	Unlimited openings - everyone accepted
Group 2	Many openings - most applicants accepted
Group 3	Openings somewhat limited - some qualified students not admitted
Group 4	Limited openings - many applicants not accepted
Group 5	Few openings - very few students accepted

Admissions criteria (Degree of selectivity in student selection). This variable is distinct from the Demand for the Program variable. It pertains directly to admissions requirements for entry to a given department and, as such, includes not only demonstrated prior academic achievement (e.g., grade averages) but, in many cases, prerequisite courses taken in high school.

The following scale was used for measuring admissions criteria for each department:

Group 1	All applicants admitted
Group 2	Most applicants admitted
Group 3	As many applicants rejected as admitted
Group 4	More applicants rejected than admitted
Group 5	Very few applicants admitted

Student-faculty ratio. When one considers the increasing specialization of the technical, health and business fields, the critical importance of

having a student-faculty ratio which is low enough to allow for individualized instruction may be a key element in the ability of instructors to reach all their students satisfactorily. Thus, the researcher suggests, this variable may very possibly have a direct influence on ultimate student success or failure in college.

Data employed to develop the criteria ranking for this characteristic were obtained from departmental admissions records in 1973 and 1974. The following scale was used to rank varying student-faculty ratios;

Group 1	Excellent	Average: ten to one
Group 2	Good	Average: fifteen to one
Group 3	Adequate	Average: twenty-three to one
Group 4	Inadequate	Average: twenty-nine to one
Group 5	Unsatisfactory	Thirty to one and up

Facilities. The quality, quantity and availability of laboratories, equipment, hardware, classrooms and supplies are often of crucial importance in occupational training. In addition, the age of the facilities used for technical training is important since graduates must be familiar with the technological level of the machinery, instruments and equipment they will use in the world of work.

The researcher contends that the lack of modern and complete facilities may not only seriously impede a student's academic progress but may effect his or her motivation to learn as well thereby becoming a factor which can determine persistence and withdrawal patterns in a given department.

At most technically oriented colleges there is, of necessity, a certain degree of interdepartmental use of facilities. This is especially true in

the health sciences due to the high cost of medical equipment. However, for its own specialized instructional purposes, each department must also maintain its own laboratories and work sections. These individual departmental facilities were evaluated for the purposes of developing this variable.

In drawing up the criteria rankings for this variable, the following factors were used: age of facilities, technological sophistication of equipment, adequacy of laboratories, instruments, equipment, and machinery, (was there enough hardware to meet the "hands-on" needs of all students?), and availability of supplies and other software materials.

These elements were placed on a matrix prepared by the researcher and individually evaluated by each respective department head and the former Dean of Administration. Each factor was given an equal weight.

Ratings ranged as follows:

Group 1	Excellent Department ideally equipped.
Group 2	Good Department could use additional instructional facilities but generally deficiencies were minor.
Group 3	Adequate Department did meet instructional needs but has several equipment deficiences.
Group 4	Inadequate Department has serious equipment needs.
Group 5	Unsatisfactory Department fails to meet students' needs because of serious equipment deficiences.

Methods of Analysis

Descriptive statisitics. The descriptive statistics for this study were developed in the following manner:

(1) The number of students in each of the fourteen attrition sub-groups were counted by department. (Transfer students were not included.)

(2) To provide empirical evidence for collapsing the sub-groups, the mean, median, mode and standard deviation of the variables age, high school rank, socio-economic status were computed. A frequency count was made on the variables economic independency/dependency status, veteran status, sex, marital status, high school rank, and socio-economic status.

(3) For the total student sample, the mean, median, mode of the variables age, high school rank and socio-economic status were figured in order to be able to fill the appropriate statistic for missing data.

Collapse of Categories. An examination of the totals of the fourteen sub-categories revealed that the small numbers in certain groups tended to render the results of little meaning which led to the collapsing of the fourteen sub-groups into six major attrition categories. These, described in detail earlier in this Chapter, were:

Persister--graduated on time
Dropout--dismissed by college
Defaulter--dropped out first semester with no grades
Stopout--dropped out after receiving grades
Finisher-graduated late
Non-finisher--did not graduate by August 1976.

Descriptive statistics on major attrition categories. The number of students in each category by department was based on the mean and standard deviation on sex, marital status, socio-economic status, high school rank, veteran, economic independency/dependency status and age.

Discriminant Analysis of Student Characteristics

Discriminant analysis was selected for examining student characteristics because it is a procedure which takes a multiple set of predictors (the student characteristics) and is capable of finding the combination or combinations of predictors which can most powerfully distinguish between groups of subjects (attrition categories).

An assumption made in discriminant analysis and other parametric statistical techniques is that the predictors are interval scaled variables. The reader will have noted that four of the predictor variables in this study are nominally scaled: sex of student, marital status, veteran, economic independency/dependency status. The researcher selected a procedure by which these nominal variables were dummy coded as 1 = inclusion; and 0 = exclusion. This rationale can be found in Fishbein and is an acceptable technique to use in the analysis of any general linear mode.[36]

The attrition data includes seven predictor variables (student characteristics) and six attrition categories. It is therefore possible to derive a maximum of five functions (or combinations of variables) with which to predict attrition. Ideally, the researcher would desire fewer functions so that they would give more meaningful interpretation.

Analysis of Student Characteristics by Division

The researcher was interested in determining the potency of predictors within each department but there was a major limitation to attempting this analysis. This constraint was that many departments had too few students to conduct such an analysis. (Some departments had as few as three or four students). As an alternative to this method, the researcher collapsed over departments into three divisions from which students were sampled (technical, health and business) and performed a discriminant analysis on each major career division.

Analysis of Institutional Characteristics

Six institutional characteristics were gathered for thirty-five departments. In addition, the analysis of student characteristics gave the percent of students in each attrition category by department.

A procedure was sought for analyzing this data parallel to that used for analyzing the student characteristic data. Due to the nature of the variables to be predicted, that is a frequency distribution, it was not possible to use discriminant analysis. For purposes of this study, the researcher assumed that the rankings of institutional characteristics formed interval scales. Since each variable formed a five point scale, this made the assumption of interval scales such as that assumed in traditional attitude studies (Likert).

In the analyses of student characteristics, previously described, the criterion variable used was the attrition category. When one looks at the criterion variable (attrition) for each department, the data consists of

a frequency distribution representing the percentage of students in each of the six categories of interest. Although frequency distributions or percents are generally viewed as non-parametric data, the researcher in this case made the assumption that these data formed parametric scales because any single category or all categories taken together was verified as equally valid measures of attrition. The researcher had the option to create a single variable from the six percents (possibly a rank for each department) to describe departmental attrition. However, he felt this procedure would lose a great deal of detailed interpretation allowed by using the six percentages. Consequently, the researcher assumed parametric attributes and selected to do a multivariate regression analysis which simultaneously yields the canonical correlation between the six predictor variables and the dependent measures (percents of students in six categories).

Interaction Analysis

A method was sought to perform as interaction analysis of the influenece of student characteristics and institutional characteristics on attrition. This method could use the department as the unit of analysis and could potentially score each department on the six institutional characteristics (as was already done) as well as come up with some measure for each department reflecting student characteristics. These representations of student characteristics in each department might be ranks, ratios or other indicators.

The researcher chose not to employ any of these potential methods because of the great amount of information that would be lost. In addition, the following problems would have been encountered:

(1) As already pointed out, many departments had too few students to give these statistics any meaningful values.

(2) Confounding of both sex of student and high school rank with department would have resulted.

CHAPTER IV

ANALYSIS OF DATA

Introduction

This chapter includes an analysis and interpretation of attrition data gathered for this study. In keeping with the stated objectives of the study, attrition data are analyzed first for the total student sample, then for the student sample by division, and finally for departmental characteristics. Various descriptive information is included to clarify statistical analyses. This is followed by a discriminant analysis of student characteristics for the total student sample and by division. To determine the influence of institutional characteristics on STCC attrition, a multivariate regression analysis was performed using the department as the unit of analysis; results of this analysis conclude Chapter IV.

Description of Overall Attrition Patterns

The distribution and percentages of students falling into the six attrition categories are displayed in Table 3. Inspection of Table 3 demonstrates that the number of completers (persisters and finishers combined) represents 752 students or forty-one percent of the entire sample, indicating that only slightly better than two out of every five matriculants actually graduated from their programs within the time period designated for this study. This low rate of completion takes on added significance when one considers that the sample is comprised

of only career (occupational) students, a group generally believed to have firmly established educational goals at matriculation time (established enough, at least, to have selected a specific career program).

TABLE 3

DISTRIBUTION OF STUDENTS INTO ATTRITION CATEGORIES

	Dropout	Persister	Finisher	Defaulter	Stopout	Non-finisher
Number of Students	51	289	463	498	215	317
Percentage	2.8	15.8	25.1	17.1	12.0	17.2

It should be pointed out that the 317 non-finishers no doubt include some students who eventually completed their programs at STCC but who, for a variety of reasons such as academic difficulty, taking a reduced course load per semester, leaving school temporarily or other causes did not finish by the study's cutoff date. While such potential graduates would be counted as finishers if a subsequent STCC attrition study having a completion point beyond the August 1976 termination date were conducted, the significant finding here is that data available for this report reveals that nearly one out of every five career students at the college did not finish his/her program by the end of summer 1976, even though that individual began as a fulltime enrollee two or three years earlier.

Another sizeable group of matriculants fell into the defaulter category--17.1 percent of the study sample. Nearly one-fifth of all students who signed up for and paid all tuition and fees to take a program did not remain in school even long enough to obtain their first term grades (13 weeks). This is viewed as a significant finding.

Collectively, those who did not finish their programs within the time parameters set for the study (defaulters, dropouts, stopouts, and non-finishers) constituted 1081 students or nearly three out of every five enrollees (59.1 percent) at STCC.

Description of Attrition in Terms of Student Characteristics

Exploration of attrition by sex of student. Females had a far superior history of program completion at STCC than males. In the persister category, 58.1 percent of the women completed their studies compared to 41.9 percent of the males. Among finishers, the ratio was 63.3 percent women to 36.7 percent males.

The greatest variance between the two sexes was found in the dropout classification: those students who were academically dismissed. There were more than three times the number of men in this group than women (76.5 percent males--23.5 percent females). The writer suggests this difference may reflect the generally stricter academic admissions procedures (discussed later in this chapter) for STCC's health programs which are heavily female in enrollments. Results are found in Table 4.

TABLE 4

ATTRITION CLASSIFICATION BY SEX OF STUDENT

	Dropout	Persister	Finisher	Defaulter	Stopout	Non-finisher	Total
Female	12	168	293	208	81	110	872
	23.5	58.1	63.3	41.8	37.7	24.7	47.6
Male	39	121	170	290	134	207	961
	76.5	41.9	36.7	58.2	62.3	65.3	52.4
Total	51	289	463	498	215	317	1833
	2.8	15.8	25.3	27.2	11.7	17.3	100.0

Exploration of attrition by marital status. Nine-tenths of all students in the sample were single. All categories except one (non-finishers) fell within six percent of this average. Among the non-finishers, single students accounted for 83 percent of the total and married students for 17.8 percent. Thus nearly one out of every five non-finishers was married. This latter result may be a reflection of the difficulties which family commitments place upon spouses attending college.

TABLE 5

ATTRITION CLASSIFICATION BY MARITAL STATUS

	Dropout	Persister	Finisher	Defaulter	Stopout	Non-finisher	Total
Single	48	277	408	454	192	263	1642
	94.1	95.8	88.1	91.2	89.3	83.0	89.6
Married	3	12	55	44	23	54	191
	5.9	4.2	11.9	8.8	10.7	17.0	10.4
Total	51	389	463	498	215	317	1833
	2.8	15.8	25.3	27.2	11.7	17.3	100.0

Exploration of attrition by socio-economic status. As can be seen in Table 6, the variable, socio-economic status, did not produce any important results relative to this chracteristic's influence on attrition. Because the means are virtually the same for all six categories; taken by itself, socio-economic status as a prediction of attrition was poor.

TABLE 6

ATTRITION CLASSIFICATION BY SOCIO-ECONOMIC STATUS

	Mean	Std Dev
Dropouts	5.8235	2.1043
Persisters	5.6125	1.8415
Finishers	5.6566	1.7447
Defaulters	5.9558	1.5415
Stopouts	5.9256	1.7546
Non-finishers	5.5426	1.7308

Exploration of attrition by high school rank. Prior academic achievement, as measured by grade point average (GPA), has long been used as a variable in the prediction of academic success in college. It is equally valuable in attrition analysis as a measure for correlating past (high school) grades to college completion records. Table 7 is clear evidence that, as expected, students who possessed the highest ranks in their secondary school graduating classes were more likely to succeed at STCC as both the greatest number of completers (persisters and finishers) came from this group. Conversely, as anticipated, non-completers included more students who had low high school ranks while dropouts (those dismissed for academic reasons) had the lowest high school ranks of the six groups.

TABLE 7

ATTRITION CLASSIFICATION BY HIGH SCHOOL RANK

	Mean	Std Dev
Dropouts	6.1569	2.1384
Persisters	4.4948	2.1508
Finishers	4.5616	2.3234
Defaulters	5.5241	2.1183
Stopouts	5.6791	2.0721
Non-finishers	5.5552	2.0160

Exploration of attrition by veteran status. One out of every ten students in the sample was a veteran. Within a five percent range, this ratio remained constant for all attrition groups. While not as consistent an indicator as others, generally non-veterans were more likely to be persisters. The highest number of veterans were found in the non-finisher and stopout categories. An explanation for this finding may be that some veterans at STCC have been known to matriculate in college study solely to obtain government benefits with no more solid motivation for their decision. Given the academic and other demands of attending college, this may be the reason for the large number of veterans falling into these two categories.

TABLE 8

ATTRITION CLASSIFICATION BY VETERAN STATUS

	Dropout	Persister	Finisher	Defaulter	Stopout	Non-finisher	Total
Non-veteran	46	277	427	447	186	272	1655
	90.2	95.8	92.2	89.8	86.5	85.8	90.3
Veteran	5	12	36	51	29	45	178
	9.8	4.2	7.8	10.2	13.5	14.2	9.7
Total	51	289	463	498	215	317	1833
	2.8	15.8	25.3	27.2	11.7	17.3	100.0

Exploration of attrition by economic independency/dependency status. A review of Table 9 displays only two meaningful results. Among persisters, dependent status was somewhat higher than the norm--92.7 percent versus 83.8 percent. While in the non-finisher category, one in four (25.9 percent) belonged to the independent group.

Independent students tended not to be persisters having only 7.3 percent in that category in contrast to the overall percentage for all six categories of 16.2 percent. The author suggests that the reason for this finding may be that, since most independent students were married and older, other commitments, family and financial, may have made it difficult for them to finish their courses within the prescribed period of time.

TABLE 9

ATTRITION CLASSIFICATION OF ECONOMIC INDEPENDENCY/ DEPENDENCY STATUS

	Dropout	Persister	Finisher	Defaulter	Stopout	Non-finisher	Total
Ind	8	21	78	67	41	82	297
	15.7	7.3	16.8	13.5	19.1	25.9	16.2
Dep	43	268	385	431	174	235	1536
	84.3	92.7	83.2	86.5	80.9	74.1	83.8
Tot	51	289	463	498	215	317	1833
	2.8	15.8	25.3	27.2	11.7	17.3	100.0

Exploration of attrition by age. As a factor for measuring predictability of persistence or withdrawal from STCC, age was a potent characteristic. Overwhelmingly, younger students were persisters and older students, non-finishers.

An examination of Table 10 shows that persisters were approximately two years younger than non-finishers. This may be due to (1) younger students, having more recently been in school, being more attuned to the academic climate than those who returned to STCC after having been out of the classroom for longer periods and (2) older students having

more outside responsibilities calling on them making the completion of a program in the normal one-year or two-year periods more difficult.

TABLE 10

ATTRITION CLASSIFICATION BY AGE

	Mean	Std Dev
Dropouts	23.3137	2.4207
Persisters	22.7163	4.3830
Finishers	24.2030	5.3393
Defaulters	22.0080	.2764
Stopouts	24.5070	6.6332
Non-finishers	24.8644	6.2275

Results of Discriminant Analysis of Student Characteristics for Total Student Sample

Univariate F-ratios. The univariate F-ratios indicate to the experimenter the power of each predictor taken by itself. They are a good estimate of the strength of predictors in the multivariate analysis. Looking at the univariate F-ratios for the seven student variables (Table 11), the researcher noted that, as expected, high school rank and sex were the two best predictors of attrition at STCC. Based on the findings of Astin, it was also believed that socio-economic status would be important. But in this analysis, as seen by the univariate F-ratios, this variable taken alone turned out to be the weakest predictor of all. This may have been a result of the study's lack of income figures for use in the analysis since the researcher had been unable to extrapolate wages from the occupational titles derived from a record of individual folders. A somewhat unexpected result was that, taken by itself, age showed up as the third most powerful predictor. This is in keeping with Knoell's earlier

studies on four year college students which found age a meaningful predictor, namely, the younger student has more chance of success in college.

TABLE 11

RANK ORDERING OF PREDICTIONS BY UNIVARIATE F-RATIOS FOR DISCRIMINANT ANALYSIS

Rank	Variate	Univariate F
1	Sex	22.6057
2	HS Rank	22.1867
3	Age	20.8684
4	Eco-Ind/Dep	8.7841
5	Mar Stat	6.1954
6	Vet	4.6623
7	Soc-eco	3.4650

Intercorrelation of predictors. In discriminant analysis, variables which share predictability power tend to confuse the interpretation of discriminant function coefficients. When two variables contain the same amount of power, often neither of them appears in the discriminant function. Therefore, the researcher first verified the shared contributions of predictors by examining the correlation matrix between predictors as show in Table 12. Here it was shown that being independent, being married, being older and being a veteran were highly related to each other as was expected. Fortunately though, when the actual discriminant function coefficients were examined, some of these variables did demonstrate a unique contribution.

TABLE 12

INTERCORRELATION OF PREDICTORS FOR DISCRIMINANT ANALYSIS

Sex	1.00000					
Mar Stat	.03072	1.00000				
Soc-eco	.01928	.05189	1.00000			
HS Rank	.19969	.06424	.00339	1.00000		
Vet	.27843	.35898	.05178	.03839	1.00000	
Eco-Ind/Dep	.06905	.57424	.07763	.01463	.50028	1.00000
Age	.00277	.53979	.05015	.00757	.33189	.57814

Discriminant Functions

In Table 13, three discriminant functions were found to be significant at the .05 level. And in Table 14 which presents the standardized discriminant function coefficients, the researcher elected to interpret all of the non-zero coefficients using a cutoff of .5, but in all cases examining the weights of each variable. A discussion of the three functions and their tables follows.

First function. The first function was found to be primarily composed of the variables, high school rank and sex, each with a magnitude greater than .6, the negative signs meaning that a person who scores highest on this function will be a female who has high high school rank. Looking at Table 15, Centroids of Groups on Three Discriminant Functions, it is clear that this function distinguishes between persisters and finishers (e.g., completers) who received high positive centroids of high high school rank tended to have the greatest success in college.

Second function. The second discriminant function was primarily composed of the variable, age. Because of the negative weight on age, persons who

are younger should score highly on this function. It can be seen in Table 15 that persisters and defaulters are distinguished as younger on this function than all other attrition groups. Although the researcher was unable to find any situation precisely parallel to this finding in the literature, it may represent two types of students who come (or are directed) to college directly from high school. One group is very goal oriented and probably long before made a firm decision regarding their career training. The second may simply be in college for something to do or to please their parents. The result is that the former stay and graduate while the latter only remain long enough to try "college" (or say they "tried" it) and leave.

Third function. The third function was found to be a combination of marital status, economic independency/dependency status and age. Glancing at Table 14 , one sees that persons who are married, financially independent and younger score highly on this function. In Table 15, one sees that late finishers, defaulters and non-finishers score the highest on this function but the contrast between these three groups and other attrition groups is not as striking as the contrasts found in the previous two functions. The category scoring lowest on this function is the dropouts implying that this group tends to be single and dependent although somewhat older than other students at the college. The researcher suggests that this function is descriptive of high school graduates who may have been "hanging around" the house or locked into menial, deadend jobs and who entered college either just to find something to do or to stop

their families from nagging them (or both). With these motivations, it is hardly surprising this group comprise the largest number of dropouts.

TABLE 13

DISCRIMINANT SIGNIFICANCE
OF FUNCTIONS

Number	Eigenvalue	Canonical Correlation	Wilks Lambda	Chi-Square	D.F.	Significance
1	.10945	.31409	.83258	334.65321	35	0
2	.06394	.24515	.92371	144.95079	24	.000
3	.01052	.10203	.98277	31.74573	15	.007

TABLE 14

STANDARDIZED DISCRIMINANT WEIGHTS
FOR THREE FUNCTIONS

Variable	Function 1	Function 2	Function 3
Sex	-.60043	-.19763	-.29916
Mar Stat	-.15284	.51214	.83167
Soc-eco	-.15815	.26271	-.22119
HS Rank	-.64246	-.05725	.00743
Vet	-.01729	.13127	.01384
Eco-Ind/Dep	-.20925	-.06373	.55597
Age	.31597	-1.05042	-.65256

TABLE 15

CENTROIDS OF GROUPS ON THREE DISCRIMINANT FUNCTIONS

Group	Function 1	Function 2	Function 3
Dropouts	-.57064	-.09027	-.25700
Persisters	.36596	.16890	-.11925
Finishers	.40632	-.09306	.05907
Defaulters	-.26810	.32454	.05542
Stopouts	-.23949	-.23308	-.16729
Non-finishers	-.25168	-.35530	.09018

Description of Attrition Patterns in Divisions

One result above all others stands out upon inspecting Table 16 (Distribution of Students into Attrition Categories by Division); the superior performance of students in the health division compared with those in the business and technical areas. By wide margins, health matriculants scored highest in the completer group (persisters and finishers) and lowest among the non-completers (defaulters, non-finishers, stopouts and dropouts). Additionally, the health division's record of having less than one percent dropouts (compared to 3.2 percent in the technologies and 3.9 percent in business studies) may also be a reflection of its (health's) more stringent and, perhaps, more realistic admissions policies. Further evidence of this may be health's record of having well over three out of every five students who began a medical curriculum, completing his or her program by the study's cutoff date.

It is important to note that despite a 68.6 percent record of completers (persisters and finishers), the number of finishers in the health division is nearly double the number of persisters (220 to 116).

TABLE 16

DISTRIBUTION OF STUDENTS INTO ATTRITION CATEGORIES BY DIVISION

		Dropout	Persister	Finisher	Defaulter	Stopout	Non-finisher	Total
Technical	N	24	94	133	228	115	157	751
	%	3.2	12.5	17.7	30.4	15.3	20.9	41.0
Health	N	4	116	220	72	38	40	490
	%	.8	23.7	44.9	14.7	7.8	8.2	26.7
Business	N	23	79	110	198	62	120	592
	%	3.9	13.3	18.6	33.4	10.5	20.3	32.3
Totals	N	51	289	463	498	215	317	1833
	%	2.8	15.8	25.3	27.2	11.7	17.3	100.0

(Finishers also exceed persisters in the other two divisions). In view of health's otherwise superior record and its strict admissions criteria, the lack of more persisters may possibly be explained by two special aspects of the college's students in the medical fields. (1) Because of their usually more academically demanding courses, health students often take some of their "non-career" requirements such as English, psychology, laboratory sciences, human relations and the like during their normal stay at STCC but outside of the regular daytime class hours--at night, in an interim semester or summers thus decreasing their daytime load. (2) Due to the preponderance of women in these programs, family commitments and fiscal problems frequently make it impossible for many females to finish their programs within the standard one or two years forcing them to extend their academic careers an extra semester or more. Students whose records

indicated they pursued either of these two paths were automatically placed in the finisher category although those who opted for the first alternative (taking extra courses during the scheduled one or two years) did, in fact, complete their programs on time.

Generally, entrance to the business programs is less selective than to either the technology or health areas. This could account for the large number - 33.4 percent, or 1 in 3 in the business division, who fall into the defaulter group, those who leave college even before the first semester is over. This suggests that possibly some business students opt for that division instead of the usually more rigorous technical or medical fields and, who, shortly after matriculating, find that business is not for them. The 30.4 percent defaulters in the technical area might be accounted for by faculty admissions policies or the academic rigor of these programs which are generally harder than in business. Overall, the attrition record of both business and technical were quite similar.

Description of Student Characteristics in Divisions

Sex of student by division. STCC was not an exception to the traditional preponderance of women enrollees' in its health programs. As can be seen in Table 17 better than four out of every five medical trainees was a female (84.7 percent).

Males, on the other hand, predominated in those programs historically pursued by men; the technical division had 88.0 percent male enrollments.

Within the business division, the sex of student ratio was more evenly divided: 55.1 percent females to 44.9 percent males. The large number of women in the business departments was no doubt a reflection of the many secretarial courses offered at STCC, programs which have only female enrollments.

TABLE 17

DIVISION CLASSIFICATION BY SEX OF STUDENT

	Female	Male	Row Total
Technical	90	661	751
	12.0	88.0	41.0
Health	456	34	490
	93.1	6.9	26.7
Business	326	266	592
	55.1	44.9	32.3
Column Total	872	961	1833
	47.6	52.4	100.0

Marital status by division. Most STCC career students were not married (89.6 percent). The breakdown by division revealed that there was relatively little difference between individual division percentages and the norm; 91.2 percent in the technologies, 90.0 percent in the business programs with health, which has large female enrollments, slightly below the average with 86.3 percent of those in the medical programs being single.

TABLE 18

DIVISION CLASSIFICATION BY MARITAL STATUS

	Single	Married	Row Total
Technical	686	55	751
	91.3	8.7	41.0
Health	423	67	490
	86.3	13.7	26.7
Business	533	59	592
	90.0	10.0	32.3
Column Total	1642	191	1833
	89.6	10.4	100.0

Socio-economic status by division. It is apparent from Table 19 that there were virtually no differences across divisions regarding students' socio-economic status. This characteristic had relatively little value as a predictor of attrition.

TABLE 19

DIVISION CLASSIFICATION BY SOCIO-ECONOMIC STATUS

	Mean	Std Dev
Technical	5.7694	1.7133
Health	5.6853	1.8159
Business	5.8079	1.7332

High school rank by division. It was generally found that students in the health programs finished higher in their high school graduation classes than students in either business or the technologies. Of these two, students in business had the poorest overall secondary school performance.

TABLE 20

DIVISION CLASSIFICATION BY HIGH SCHOOL RANK

	Mean	Std Dev
Technical	5.6061	2.1501
Health	4.5703	2.1760
Business	5.3854	2.2419

Veteran status by division. Across STCC approximately one out of every ten students was a veteran. Examining this characteristic by division revealed that among technical students who are largely males, there were more veterans than in the total population (14.0 percent to 9.7 percent) while in the business programs there were fewer than the average (8.6 percent). Predictably, there were very few veterans among the health students with their large numbers of female students--only 4.5 percent.

TABLE 21

DIVISION CLASSIFICATION BY VETERAN STATUS

	Nonveteran	Veteran	Row Total
Technical	646	105	751
	86.0	14.0	41.0
Health	468	22	490
	95.5	4.5	26.7
Business	541	51	592
	91.4	8.6	32.3
Column Total	1655	178	1833
	90.3	9.7	100.0

Economic independency/dependency status by division. As has already been verified in the study, this variable was not especially powerful in

predicting attrition categories. Percentages by divisions virtually equalled the overall institutional percentage of 82.3 percent.

TABLE 22

DIVISION CLASSIFICATION BY ECONOMIC INDEPENDENCY/DEPENDENCY STATUS

	Dependency	Independency	Row Total
Technical	629 83.8	122 16.2	751 41.0
Health	414 84.5	76 19.5	490 26.7
Business	493 83.3	99 16.7	592 32.3
Column Total	1536 83.8	297 16.2	1833 100.0

Age by division. There were no major differences in the mean age among the three divisions. Health students were older by a very slight margin.

TABLE 23

DIVISION CLASSIFICATION BY AGE

	Mean	Std Dev
Technical	23.4235	3.9087
Health	23.9872	5.9882
Business	23.6044	5.0481

Results of Discriminant Analysis of Student Characteristics for Technical, Health and Business Divisions

Introduction. In the methodology section of this thesis, the researcher points out the limitations of performing a department by category discriminant analysis and why a separate discriminant analysis by each of the

major career divisions within the college was performed instead. Because of the confounding of the variable sex within divisions (that is, the health fields are primarily enrolled with females), the analysis was performed separately for each division rather than a division by category (3x6 discriminant analysis). The reader will recall that the purpose of the separate division analysis is to determine the potency of predictors within the divisions and whether the results are different between divisions and from the overall results previously described.

Technical. The results of the discriminant analysis performed on the technical division are found in Tables 24, 25 and 26. Two functions were found that were similar to the first two functions found in the overall discriminant analysis already discussed. The most significant function for technical students was composed of the variables age and veteran status. Persons who were older and non-veterans scored the highest on this function. These were primarily finishers. Persons who were younger and veterans tended to be defaulters. This result is very similar to the overall results, but in the overall results persisters were also shown to be younger. This could be accounted for by the fact that there were few persisters in the technical division.

The second significant function was primarily weighted by the variable high school rank and is also similar to the first significant function found in the overall discriminant analysis. Here, this function separated persisters who had high high school ranks from all other categories whereas in the overall discriminant function, finishers were grouped with persisters on this function. This did not occur here because

finishers were so underrepresented in the technologies. Generally, the results for the technical division discriminant analysis paralleled the results for the overall discriminant analysis except for a third function composed of other variables such as marital status and economic independency/dependency status which did not appear as significant.

TABLE 24
SIGNIFICANCE OF FUNCTIONS IN DISCRIMINANT ANALYSIS FOR TECHNOLOGIES

Number	Eigenvalue	Canonical Correlation	Wilks Lambda	Chi-Square	D.F.	Significance
1	.11578	.32212	.82130	146.56929	35	.000
2	.06891	.25390	.91638	65.00881	24	.000

TABLE 25

STANDARDIZED DISCRIMINANT WEIGHTS FOR TWO FUNCTIONS FOR TECHNOLOGIES

Variable	Function 1	Function 2
Sex	.35841	-.07882
Mar Stat	-.40762	-.09210
Soc-eco	-.30260	-.12139
HS Rank	-.25792	-.91026
Vet	-.60403	-.03148
Eco-Ind/Dep	.26739	-.20858
Age	1.05258	-.23848

TABLE 26

CENTROIDS OF GROUPS ON DISCRIMINANT FUNCTION FOR TECHNOLOGIES

Group	Function 1	Function 2
Dropouts	.14115	-.34902
Persisters	.12343	.57977
Finishers	.47162	.03357
Defaulters	-.46711	.03501
Stopouts	.06645	-.23232
Non-finishers	.17682	-.24662

Health. In the discriminant analysis of the health division, only one discriminant function was found. The results of these analyses are presented in Tables 27 through 29. This function was most highly weighted by the variable, age, although economic independency/dependency status and socio-economic status showed magnitudes of -.4 which were below the .5 cutoff the researcher chose for interpretation of results. The interpretation of this function is that students who were older, dependent and had a low socio-economic status tended to be non-finishers in the health division. Younger students here, as in the overall discriminant analysis appeared as defaulters. In searching for an explanation as to why persisters did not appear with defaulters on this function, the reason appears to be that health students tended to be younger than others at STCC and thus persisters were not found to be significantly younger. A function composed of sex and high school rank did not appear for health students because the majority of health students were females with high high school ranks and thus these variables did not have variability in this division. The health division, in contrast to technical and business, demonstrated a far better pattern of graduating. Thus the admissions department at STCC does not have to be overly concerned about its typical health student since that division showed little overall attrition. In summary, relative to health, it is less easy to generalize the results of these analyses since that division did not really reflect typical patterns at STCC.

TABLE 27

SIGNIFICANCE OF FUNCTIONS DISCRIMINANT ANALYSIS FOR HEALTH

Number	Eigenvalue	Canonical Correlation	Wilks Lambda	Chi-Square	D.F.	Significance
1	.07106	.25757	.86949	67.61551	35	.000

TABLE 28

STANDARDIZED DISCRIMINANT WEIGHTS FOR ONE FUNCTION FOR HEALTH

Variable	Function
Sex	.10951
Mar Stat	-.13945
Soc-eco	-.38857
HS Rank	-.26565
Vet	-.08591
Eco-Ind/Dep	-.44269
Age	1.21263

TABLE 29

CENTROIDS OF GROUPS ON ONE DISCRIMINANT FUNCTION FOR HEALTH

Group	Function
Dropouts	.20594
Persisters	-.06992
Finishers	.12925
Defaulters	.54791
Stopouts	.00023
Non-finishers	.45728

Business. Tables 30, 31 and 32 record the discriminant analysis performed on the business division. Of the three groups technical, business and health, business most highly reflected the patterns of the overall discriminant analysis.

Three functions were found in business. But unlike the overall discriminant analysis, the most significant function found in business was composed mainly of the variable age. A glance at Table 31 shows that within business, older students were non-finishers and stopouts and the younger students tended to be persisters and defaulters (also true in the overall analysis).

The second function was again the high school rank/sex function but here rather than showing the contrast of completers versus others, the major contrast was that dropouts tended to be mainly males with the lowest high school ranks although the original contrast of persisters and finishers versus the other categories does appear.

A consistency of results was also found in the third function. This function is primarily weighted by the variable marital status, but in addition high weights were found for age and socio-economic status as well. Students who were married, younger and of low-income families scored highly on this function. Single students who were older and had a somewhat higher socio-economic status will score low on this function. It was found that looking at Table 32, non-finishers were high on this function and dropouts and stopouts were low. This closely paralleled the results found in the overall analysis. This was the first function found in all of the analyses performed to this point in which socio-economic appears as a predictor. The researcher believes that this result is due to the

fact that the business field more than the technologies or health, has a greater range on this variable although this was not confirmed by earlier results. Compared to the other divisions, the variety of students at STCC is best reflected by the business division in that there was no single characteristic that can best describe a business student whereas being a female very well describes being a health student and similarly, being a male and of low socio-economic status are obvious characteristics of technical students at the college.

TABLE 30

SIGNIFICANCE OF FUNCTION IN DISCRIMINANT ANALYSIS FOR BUSINESS

Number	Eigenvalue	Canonical Correlation	Wilks Lambda	Chi-Square	D.F.	Significance
0	.10036	.30200	.80279	128.61158	35	.000
1	.07383	.26221	.88336	72.61775	24	.000
2	.03491	.18367	.94857	30.91306	15	.009
3	.01175	.10776	.98169	10.82062	8	.212
4	.08233	.08233	.99322	3.98232	3	.263

TABLE 31

STANDARDIZED DISCRIMINANT WEIGHTS FOR THREE FUNCTIONS FOR BUSINESS

Variate	Function 1	Function 2	Function 3
Sex	.04698	.42891	-.31127
Mar Stat	-.12849	.02565	.91421
Soc-eco	-.16988	.15640	-.53554
HS Rank	-.06910	.77172	.56595
Vet	.02218	.22634	-.15100
Eco-Ind/Dep	.08561	.15199	.27975
Age	1.04365	.16187	,55951

TABLE 32

CENTROIDS OF GROUPS ON THREE DISCRIMINANT FUNCTIONS FOR BUSINESS --

Group	Function 1	Function 2	Function 3
Dropouts	-.11883	.70992	-.35694
Persisters	-.19835	-.26391	-.16736
Finishers	.24331	-.41816	.03124
Defaulters	-.32446	.14889	.06459
Stopouts	.48310	.08089	.35945
Non-finishers	.48755	.13353	.22962

Attrition Patterns by Department

As pointed out in Chapter II (Methodology), small enrollments in certain departments tended to render results somewhat less meaningful when attrition category data were analyzed on an individual department by department basis. As a result, no discriminant analysis was performed. However, three major findings regarding departmental data warrant mentioning.

First, the most obvious finding was the overwhelming superior performance of students in the health departments in completing their programs. Among those departments which had a seventy-five percent or better completion rate, all seven departments were medically oriented. One department, Radiation Therapy, had a 100 percent completion record. In the fifty percent to seventy-five percent completion range, all but one department, T.V. Communications, also belonged in the health areas.

Second, those departments having less than half their student completers (but more than twenty-five percent) number fourteen in all and were largely made up of secretarial programs and the technologies.

Third, six departments: Fire Protection, Business Administration-Finance, Court Stenogrpaher, Automotive, Environmental and Heat and

Power had the highest dropout rates with less than twenty-five percent of their students belonging to the completer group.

Table 33 provides information on the number and percentages of students in thirty-five departments. The 554 internal transfer students are not represented in Tables 33 and 34.

TABLE 33

NUMBER OF STUDENTS BY DEPARTMENT

Department	Students	Percentage
Automotive	56	3.1
Bio-Medical	47	2.6
Business Administration	314	17.1
Business Administration-Finance	32	1.7
Civil Engineering	47	2.6
Cosmetology	48	2.6
Court Stenography	12	.7
Data Processing	136	7.4
Dental Assisting	60	3.3
Dental Hygiene	26	1.4
Early Childhood	42	2.3
Electrical	65	3.5
Electronic	83	4.5
Electronic Benchwork	7	.4
Environmental	11	.6
Executive Secretary	119	6.5
Fire Protection	6	.3
Graphic Arts	77	4.2
Heat/Power	56	3.1
Landscape Technology	72	3.9
Law Enforcement	39	2.1
Legal Secretary	59	3.2
Machine and Tool	25	1.4
Medical Assisting	53	2.9
Medical Lab Technician	30	1.6
Medical Secretary	56	3.1
Mental Health	38	2.1
Nuclear Medical	5	.3
Nursing	74	4.0
Operating Room Technician	34	1.9
Physical Therapy	23	1.3
Radiation Therapist	3	.2
Radiology Technician	28	1.5
Respiratory Therapist	26	1.4
Telecommunications	24	1.3
Totals	1833	100.0

TABLE 34

DISTRIBUTION OF STUDENTS INTO ATTRITION CATEGORIES BY DEPARTMENT

		Law Enfor.	Fire Prot.	Data Proc.	Elec.	Elec. Bnwk.	Heat Pow.	Mach. Tool	Graph Arts	Bio-Med	Cos-meto.	Dent. Asst.	Med. Asst.	Med. Lab.
Dropouts	N	0	0	6	3	0	2	1	2	0	0	0	1	1
	%	0	0	4.4	4.6	0	3.6	4.0	2.6	0	0	0	1.9	3.3
Persister	N	7	0	24	15	10	4	3	14	5	1	31	16	6
	%	17.9	0	17.6	23.1	12.0	7.1	12.0	18.2	10.6	2.1	51.7	30.2	20.0
Finisher	N	12	1	17	8	11	9	4	6	14	23	18	18	16
	%	30.8	16.7	12.5	12.3	13.3	16.1	16.0	7.8	29.8	37.9	30.0	34.0	53.3
Defaulter	N	10	0	51	22	26	14	10	19	19	15	9	8	2
	%	25.6	0	37.5	33.8	31.3	25.0	40.0	24.7	40.4	31.3	15.0	15.1	6.7
Stopout	N	4	1	16	9	19	6	6	18	2	8	1	4	3
	%	10.3	16.7	11.8	13.8	22.9	10.7	24.0	23.4	4.3	16.7	1.7	7.5	10.0
Non-fin.	N	6	4	22	8	17	21	1	18	7	1	1	6	2
	%	15.4	66.7	16.2	12.3	20.5	37.5	4.0	23.4	14.9	2.1	1.7	11.3	6.7
Totals	N	39	6	136	65	83	56	25	77	47	48	60	53	30
	%	2.1	.3	7.4	3.5	4.5	3.1	1.4	4.2	2.6	2.6	3.3	2.9	1.6

TABLE 34 (continued)

DISTRIBUTION OF STUDENTS INTO ATTRITION CATEGORIES BY DEPARTMENT

		Phys. Ther.	Oper. Rm.	Respir. Ther.	Ment. Health	Bus. Admin.	Bus.-Finan.	Telec.	Court Steno.	Legal Secy.	Exec. Secy.	Med. Secy.	Dent. Hyg.	Elec. Bench
Dropout	N	0	0	0	0	20	0	4	0	0	3	0	0	0
	%	0	0	0	0	6.4	0	16.7	0	0	2.5	0	0	0
Persister	N	9	2	7	8	50	0	0	0	3	13	13	1	0
	%	39.1	5.9	26.9	21.1	15.9	0	0	0	5.1	10.9	23.2	3.8	0
Finisher	N	13	24	6	7	48	0	0	1	15	31	15	22	3
	%	56.5	70.6	23.1	18.4	15.3	0	0	8.3	25.4	26.1	26.8	84.6	42.9
Defaulter	N	0	5	8	8	81	31	12	1	23	41	21	1	1
	%	0	14.7	30.8	21.1	25.8	96.9	50.0	8.3	39.0	34.5	37.5	3.8	14.3
Stopout	N	0	3	1	8	38	0	1	2	11	8	3	1	1
	%	0	8.8	3.8	21.1	12.1	0	4.2	16.7	18.6	6.7	5.4	3.8	14.3
Non-fin.	N	1	0	4	7	77	1	1	8	7	23	4	1	2
	%	4.3	0	15.4	18.4	24.5	3.1	4.2	66.7	11.9	19.3	7.1	3.8	28.6
Totals	N	23	34	26	38	314	32	6	12	59		56	26	7
	%	1.3	1.9	1.4	2.1	17.1	1.7	25.0	.7	3.2		3.1	1.4	.4

TABLE 34 (continued)

DISTRIBUTION OF STUDENTS INTO ATTRITION CATEGORIES BY DEPARTMENT

		Auto.	Civil Eng.	Land-scape	Rad. Ther.	Rad. Tech.	Nucl. Med.	Nurs.	Early Child.	Environ.	Totals
Dropout	N	3	1	1	0	0	0	0	2	1	51
	%	5.4	2.1	1.4	0	0	0	0	4.8	9.1	2.8
Persister	N	3	3	6	3	16	1	2	13	0	289
	%	5.4	6.4	8.3	100.0	57.1	20.0	2.7	31.0	0	15.8
Finisher	N	10	12	14	0	5	2	55	11	0	463
	%	17.9	25.5	19.4	0	17.9	40.0	74.3	26.2	0	25.3
Defaulter	N	17	10	25	0	4	1	5	6	3	498
	%	30.4	21.3	34.7	0	14.3	20.0	6.8	14.3	27.3	27.2
Stopout	N	9	9	12	0	2	0	1	6	2	215
	%	16.1	19.1	16.7	0	7.1	0	1.4	14.3	18.2	11.7
Non-fin.	N	14	12	14	0	1	1	11	4	5	317
	%	25.0	25.5	19.4	0	3.6	20.0	14.9	9.5	45.5	17.3
Totals	N	56	47	72	3	28	5	74	42	11	1833
	%	3.1	2.6	3.9	.2	1.5	.3	4.0	2.3	.6	100.0

Analysis of Institutional Characteristics

To determine the influence of institutional characteristics on STCC attrition, a multivariate regression analysis was performed with department as the unit of analysis. In addition to the types of information found in employing univariate regression analyses, the multivariate procedure also gives the canonical correlation between the predictors and attrition categories. Since the beta weights obtained in the multivariate regression are somehwat difficult to interpret, the researcher instead reports the synonomous but more meaningful multiple correlations from univariate regression analyses on the six attrition categories. The regression results are found in Tables 36 through 41. Correlations between variates and categories are located in Table 42 and the multivariate results are given in Tables 36 through 41.

A glance at Table 35 demonstrates that positive characteristics on any of the six predictors (high ranks) correlate significantly with high percentages of persisters and finishers (completers). Whereas, poor rankings on characteristics correlate highly with leaving (high negative correlations). These correlations show that if an institution wishes to determine which students are going to graduate, it should look basically at the number of openings and the selectivity of the department (e.g., admission criteria).

The canonical correlation shows this result more poignantly. However, first the regression results will be presented for each attrition category.

As already stated, Tables 36 through 41 represent summaries of the multiple regression analyses performed for attrition categories. This information is more amenable to interpretation than the beta weights from the multivariate regression analysis though the information yielded is synonymous.

Dropouts. Table 36 displays results of the regression analysis predicting placement into the dropout category. No variable actually related to the percentage of dropouts. The variable with the highest, although non-significant, Pearson Correlation is selectivity. Thus the more selective the department, the fewer the number of dropouts. (In terms of the overall analysis, this was not a significant result.)

Persisters. In Table 37 it can be seen that selectivity of the department is the most powerful predictor of success. This predictor by itself accounts for twenty-three percent of the variability in predicting membership in the persister category. Since all predictors correlated positive with having high percentages of persisters in a department, the inference to be drawn from this analysis is that high standards relate to a high percentage of persisters.

Finishers. Table 38 also reflects that high standards relate to a high percentage of finishiers. The single best predictor is having fewer openings for a large number of eligible applicants.

Defaulters. This regression analysis clearly shows that having low standards relates to having a high percentage of defaulters. The single best predictor of defaulters is low selectivity.

Stopouts. Here again one sees that low standards relate to a high percentage of stopouts. The best predictor of percentage of stopouts is low selectivity.

Non-finishers. Low standards means more likelihood of being a non-finisher. The single best predictor of non-finishers is poor facilities.

The multivariate regression focuses on determining the set of institutional characteristics which best predicts attrition patterns at STCC. The weights for the canonical functions best demonstrate these results. The remainder of the multivariate regression procedure replicates the results just presented in the previous section. Hence, only the canonical results will be described.

Only one canonical variate was found to be significant. The canonical correlation between institutional characteristics and attrition was found as: R = .887. This correlation was significant at the .0001 level. Refer to Table 42 for this result.

Tables 43 and 44 give the canonical weights for institutional weights for institutional characteristics and attrition categories, respectively. These results demonstrate that the set of variables, number of openings and selectivity, best distinguish between completers (persisters and finishers, and to some extent, non-finishers) and leavers (dropouts, stopouts and defaulters). Thus if the institution wishes to know which students are going to graduate, it should look basically at the number of openings and how selective a department is in line with the conclusion that the more selective a department is and the fewer number of openings it has relative to the number of eligible candidates, the more students who will survive the program.

TABLE 35

CORRELATIONS BETWEEN INSTITUTIONAL CHARACTERISTICS AND ATTRITION

		Dropout	Persister	Finisher	Defaulter	Stopout	Non-finisher
Salary	r	.0828	.3237	.1343	-.2794	-.1970	-.1950
	Sig	.318	.029	.221	.052	.128	.131
Credentials		.0417	.2994	.0015	-.2541	-.1482	-.0363
		.406	.040	.497	.070	.198	.418
No. Openings		-.2343	.3975	.6132	-.4878	-.6151	-.4160
		.088	.009	.001	.001	.001	.006
Selectivity		-.2693	.4801	.4375	-.4924	-.6234	-.2766
		.059	.002	.004	.001	.001	.054
Stu-Fac Ratio		.0868	.2352	.1003	-.3269	-.0162	-.0879
		.310	.087	.283	.028	.463	.308
Facilities		-.0979	.4052	.2611	-.2725	-.1637	-.4465
		.288	.008	.065	.057	.174	.004

TABLE 36

REGRESSION ANALYSIS--DROPOUTS

	Multiple R	R Square	Simple R	Overall F	Significance
Salary	.35056	.12289	.08276	2.24178	.123
Credentials	.36362	.13222	.04170	1.57442	.215
Selectivity	.26930	.07252	-.26930	2.58031	.118
Stu-Fac Ratio	.36997	.13688	.08675	1.18941	.336
Facilities	.37229	.13860	-.09875	.93324	.474

TABLE 37

REGRESSION ANALYSIS--PERSISTERS

	Multiple R	R Square	Simple R	Overall F	Significance
Salary	.62150	.38627	.32265	3.65037	.011
Credentials	.60736	.36889	.29941	6.03994	.002
No. Openings	.61560	.37897	.39751	4.57667	.005
Selectivity	.48012	.23051	.48012	9.88576	.004
Stu-Fac Ratio	.62247	.38747	.23524	2.95196	.023
Facilities	.54293	.29477	.40525	6.68770	.004

TABLE 38

REGRESSION ANALYSIS--FINISHERS

	Multiple R	R Square	Simple R	Overall F	Significance
Salary	.64749	.41924	.13427	5.41407	.002
Credentials	.64872	.42084	.00146	4.21454	.005
No. Openings	.61319	.37600	.61319	19.88455	.000
Selectivity	.63085	.39797	.43751	10.57657	.000
Stu-Fac Ratio	.64926	.42154	.10032	3.40078	.012
Facilities	.64123	.41118	.26113	7.21582	.001

TABLE 39

REGRESSION ANALYSIS--DEFAULTERS

	Multiple R	R Square	Simple R	Overall F	Significance
Salary	.58698	.34454	-.27944	3.04880	.125
Credentials	.55617	.30932	-.25407	4.62778	.009
No. Openings	.58507	.34321	-.48784	3.90347	.011
Selectivity	.49236	.24242	-.49236	10.55964	.003
Stu-Fac Ratio	.52460	.27520	-.32687	6.07509	.006

TABLE 40

REGRESSION ANALYSIS--STOPOUTS

	Multiple R	R Square	Simple R	Overall F	Significance
Salary	.69783	.48696	-.19700	4.42951	.003
Credentials	.69702	.48584	-.14823	4.48051	.001
No. Openings	.68494	.46915	-.61509	9.13326	.000
Selectivity	.62340	.38862	-.62340	20.97667	.000
Stu-Fac Ratio	.66236	.43873	-.01618	12.50662	.000
Facilities	.69216	.47909	-.16367	6.89782	.000

TABLE 41

REGRESSION ANALYSIS--NON-FINISHERS

	Multiple R	R Square	Simple R	Overall F	Significance
Salary	.51879	.26914	-.19504	1.71852	.154
Credentials	.50686	.25690	-.03634	2.59289	.056
No. Openings	.49333	.24337	-.41601	5.14640	.012
Selectivity	.51431	.26452	-.27660	2.08559	.096
Stu-Fac Ratio	.50167	.25168	-.08792	3.47532	.028
Facilities	.44648	.19935	-.44648	8.21634	.007

TABLE 42

SIGNIFICANCE OF CANONICAL CORRELATIONS FOR INSTITUTIONAL CHARACTERISTICS

Number	Eigenvalue	Canonical Correlation	Wilks Lambda	Chi-Square	D.F.	Significance
1	.28600	.88657	.07937	72.20888	36	.000

TABLE 43

COEFFICIENTS FOR PREDICTOR VARIABLES

	Canvar 1	Canvar 2	Canvar 3	Canvar 4	Canvar 5	Canvar 6
Salary	.09122	.13454	-.24501	-.04157	-.09479	1.31198
Credentials	-.17476	-.00919	-1.01000	-.09195	.12930	-.16178
No. Openings	-.64768	-.88475	-.41459	1.70706	.66825	.01353
Selectivity	-.35707	.22889	.77881	-1.75868	-.41786	-.20173
Stu-Fac Ratio	.00330	.43747	.21149	.08265	1.00859	.55696
Facilities	-.08973	.91384	-.12700	-.00316	-.83139	-.18250

TABLE 44

COEFFICIENTS FOR DEPENDENT VARIABLES

	Canvar 1	Canvar 2	Canvar 3	Canvar 4	Canvar 5	Canvar 6
Dropout	.10210	.33006	-.19250	.21163	.41000	.86356
Persister	-.51646	1.25673	1.29501	-.54794	.1101	.42262
Finisher	-.59818	.55832	1.67057	.48871	.35361	.28050
Defaulter	.16037	.37922	1.42784	-.01806	-.37968	.69293
Stopout	.28381	1.04345	.64314	.43359	.13919	-.39354
Non-finisher	-.10997	.13494	1.42527	-.76192	.60283	.17528

CHAPTER V

SUMMARY AND CONCLUSIONS

Introduction

The dilemma of attrition and how to cope with it have long challenged school and college administrators. At first glance, analyzing the subject of the dropout may not appear especially complex. However, given the diversity of variables, the difficulty of accurately tracking actual withdrawal patterns and even the matter of defining what attrition is and is not, the earnest researcher soon becomes aware that the challenge of the dropout is one of no small magnitude and not a problem lending itself to easy solutions.

Interest in student attrition has existed for decades increasing in emphasis at some periods, declining in others. Causing renewed focus on the dropout in the mid-1970s has been a series of fiscally-related factors including inflation, rising budgets, faculty salary demands and a national energy shortage. Added to this has been a general switch in public priorities away from education to other areas. In part, this latter development has been due to some general dissatisfaction with education's track record during and following the massive funding received by schools and colleges during the past ten to fifteen years and, in part, due to the press of other national problems, in particular unemployment.

Budget shortfalls, rising prices and diminishing public support have occurred at an especially unpropitious time for higher education as lowering enrollments have already made their presence felt at the primary

and secondary levels with the full impact of the national decline in births due to arrive at colleges within the next few years. Further complicating the picture has been a substantial increase in marginally prepared persons seeking college entry; this factor placing an even greater burden on higher education in terms of the need to provide expensive remedial and compensatory programs for such students in order to assure their ultimate academic success. Simultaneously, colleges have found that they must maintain their attraction to those seeking more academically rigorous courses or confront the very real risk of trying to be all things to all people and failing to be anything to anyone. This dilemma accurately describes the situation at Springfield Technical Community College which draws large numbers of educationally and economically deprived students from its nearby low-income neighborhoods while it also attempts to uphold the academic integrity of its more than forty, often academically difficult, career programs.

One result of this constrained fiscal climate, especially at tax-supported colleges like STCC, has been a move toward a recognition of the need for greater institutional accountability. As taxpayers and their elected officials become increasingly sensitive regarding the use of government revenues, public institutions are being asked and, more and more, being told, to provide concrete evidence of their effective performance. And while even most laymen would acknowledge that much in education is difficult to measure statistically, many persons, both inside and outside academia, consider the matter of college attrition a legitimate measure by which to measure efficiency and effectiveness. Paradoxically, this rising emphasis on the withdrawal problem requires the

availability of even greater resources which are becoming simultaneously and increasingly difficult to obtain.

Unfortunately an overlapping of student and institutional characteristics from institution to institution makes it difficult to make valid statistical adjustments to compensate for inequalities and differences among different schools. And because students are never, in actuality, assigned to colleges at random, generalizations, especially about attrition, are difficult to make. However, irrespective of such problems, the fiscal facts of life in 1977 clearly indicate that schools no longer have the option of casually claiming certain pre-determined factors cause high or low attrition. Each institution would appear now to have a mandate to improve its student retention rate using whatever means it needs.

Specifically, this particular study focused on an analysis of attrition at STCC using selected student characteristics and the configuration of various career (vocational) departments. The rationale for selecting this method was that the actual learning setting, the classroom, since this is the seat where cognitive learning in college ostensibly take place, may have a significant influence on whether a student remains in or leaves school.

The actual problem undertaken was to identify and measure these variables as they related to attrition performance of selected students at STCC with the intention of enabling the college to use this information to propose acceptable solutions of intervention and thereby effect operating efficiences within the context of STCC's total management system.

To accomplish this, the following objectives were sought:

-- Identify those variables common to students falling within certain attrition categories;

-- Ascertain the configuration of individual departments and divisions relative to their respective attrition performance;

-- Correlate this data and use it to propose policies of attrition reduction.

Methodology

Data was gathered on 1833 students who entered STCC as fulltime students in the fall semester of 1973 and 1974. This sample was limited to students in one and two-year programs in technical, health and business divisions. Six categories of attrition were:

1. Dropout--a student who was dismissed by the college for academic failure.
2. Persister--a fulltime day student who graduated within the one or two year time period designated for his/her program.
3. Finisher--a student who graduated late or enrolled in evening/summer/interim courses to graduate on time.
4. Defaulter--a student who voluntarily dropped out during the first semester before receiving grades.
5. Stopout--a student who dropped out after successfully completing the first semester.
6. Non-finisher--a student who did not graduate by the August 1976 cutoff date for the study.

Data defining student characteristics were collected from student files from the college's computer data base. Seven types of information were used: sex, marital status, socio-economic status, high school rank, veteran, economic independency/dependency status and age.

Student attrition was explored using a discriminant analysis procedure for the total student sample and for each of the three career divisions.

Department characteristics were derived for the same thirty-five career departments in the technical, health and business fields from which the student sample was drawn. Six departmental indicators were examined: faculty salaries, academic credentials, demand for program, admissions criteria, student-faculty ratio and facilities. Rankings were made by department heads and deans using available data.

The relationship between departmental rankings on six indicators and attrition patterns was explored using a canonical correlation.

Findings and Conclusions

Overall student sample. The analysis of the dropout performance of the total student sample revealed that attrition at STCC constitutes a problem of major proportions and one which requires the immediate attention of the college administration. A contributing reason for the need for concern is the documented trend at the college of poorly prepared matriculants, a pattern cited in the study and one which could portend even greater problems for the institution later on unless steps are taken to improve student retention.

Only forty-one percent of the students included in the study actually graduated from their programs within the time limits set for the report. In view of the fact that, since all students in the study had selected a specific program thus indicating at least minimally defined career goals, the researcher considers this small number of finishers especially disturbing.

Also significant was the fact that nearly one out of every five students (17.1 percent) did not remain at STCC to complete a single semester. The author suggests that other results of the study, specifically the importance the selection criteria and the number of openings in each department, would indicate that this high number of defaulters could be due to lack of adequate academic preparation or poor counselling.

Overall student characteristics. In exploring student attrition by student characteristics, seven different variables were examined: sex, marital status, socio-economic status, high school rank, veteran, economic independency/dependency status and age.

The exploration by sex of student showed females having a far better history of program completions at STCC than males. Women rated better than men in all six of the major attrition categories. In view of this finding and in particular of the fact that more than three times the number of men were in the dropout category (those academically dismissed), the investigator suggests that this result is evidence of the superior academic backgrounds females bring with them when they come to STCC, a finding also born out in the results.

Economically independent students tended not to be persisters. Since most independent students were married and older, these factors may have contributed to their inability to complete their studies on time.

The same explanation may be the reason why married students scored high in the non-finisher group; this result being a reflection of the constraints which family commitments place upon married persons attending college.

As an influence on attrition, the variable, socio-economic status did not produce any obvious results. Family income has traditionally been shown to be an important influence on attrition. It is possible the author suggests, because of the manner in which this variable was constructed (head of household's occupation rather than income was used) that this particular characteristic was not as precise, and thus less valid, than using actual income figures.

When an examination was made of attrition groups by high school rank, as expected, those students who possessed the highest ranks in the secondary school graduating classes were shown more likely to succeed at STCC. Non-completers, on the other hand, had the poorest high school records.

Veterans accounted for approximately ten percent of the student sample. The largest number of veterans were found in the non-finisher and stopout categories. A reason for this result may be that some veterans may enroll merely in order to obtain government benefits only to find that the demands of the classroom are too strenuous.

Age was an important factor in measuring predicability of persistence or withdrawal from STCC. Overwhelmingly, younger students were persisters and older student, non-finishers. Pace confirmed this finding among students in four-year colleges. This result is perhaps attributable to the fact that students only recently graduated from high school have the momentum and recent experience of the classroom and may be better able to adjust to the demands of college. Older students, on the other hand, needed more time to become acclimated to college and thus required a longer period to complete their studies.

Discriminant analysis - overall student characteristics. Overall, the discriminant analysis of the seven student characteristics yielded two significant functions indicating that females with higher grades in high school and students who were younger tended to be graduates.

Student characteristics in division. Following the collapse of individual departments across divisions, student variables were examined for the three divisions: technical, health and business.

In analyzing the sex of students in the three major divisions, as expected, females dominated the health areas (85 percent women) and males, the technologies (68 percent men). The business area had slightly more women (55.1 percent to 44.9 percent males), no doubt due to the large number of secretarial programs in this division.

Sex of student also played in role in the veterans classification with the technologies enrolling 14 percent of STCC veterans as opposed to the norm of 9.7 percent. Predictably, only 4.5 percent of the largely female health students were veterans. This finding coincides

with virtually all of the results in the current literature.

Economic independency/dependency status was not a good predictor. The percentages by division practically equalled the overall institutional percentage.

Likewise, the characteristic marital status did not exhibit any significant difference between divisions with only the health programs, with their large female populations, having slightly below the average with 86.3 percent of the health students being single; the norm across divisions was 89.6 percent. Since health students were slightly older than average this finding is somewhat difficult to explain, and the author was unable to find any comparable result in the literature.

Students studying the health programs came to STCC with better high school records than students in the other two divisions. Business students had the poorest overall academic ranks in high school. This finding is no doubt, at least in part, evidence of the more selective admissions criteria required in the medical and technical programs.

There was no significant difference in divisions regarding students' socio-economic status. This result was not expected and is contrary to many of the findings in the literature, especially results of studies about four-year schools in the United States. As already discussed, a reason for this, may have been the manner in which this characteristic was structured since actual income was not part of the composition of this variable.

Health students were older than students in the other two fields but only by a slight margin. The author is unable to explain this finding especially since, among the three divisions, fewer health students were

married, but again, by only a slight margin.

Discriminant analysis of the three divisions.

Technical. The most significant function for technical students was composed of the variables age and veteran status. Persons who were older and non-veterans were primarily finishers; those younger and veterans tended to be defaulters. A possible explanation of this result is that there were fewer persisters in this division.

The second function was weighted primarily by the variable high school rank and separated persisters with high high school ranks from all other categories.

Health. This function was most highly weighted by the variable age with economic independency/dependency status and socio-economic status having less magnitude than the .5 cutoff used for interpretations of results. The interpretation here is that students who were older, dependent and had a low socio-economic status tended to be non-finishers.

A function composed of sex and high school rank does not appear for health students because the majority of these matriculants were females with high high school ranks. Health results were somewhat more difficult to make generalizations about since the health division, as already explained, did not really reflect typical student patterns at STCC.

Business. Three functions were found in business. The first was made up primarily of the variable age. Within business, older students were non-finishers and stopouts and younger students tended to be persisters and defaulters. This was true in the overall analysis.

High school rank and sex comprised the second function; the major

contrast being that dropouts tended to be mainly males with the lowest high school ratings.

The third function showed students who were married, younger and of low-income families scoring highest. Thus non-finishers were high on this function up to this point in which socio-economic appeared as a predictor.

Overall, the business field best reflected the variety of students at STCC in that there was no single characteristic which best described a business student while being a female was typical of health matriculants and being male characteristic of technical division student.

Attrition patterns by department. In view of the small numbers of students in certain departments, results of attrition patterns by department were not as meaningful as those of the total sample or across divisions.

However, two significant patterns did emerge upon examination of the dropout rates by department. The first was the overwhelming superior performance of health students. All seven departments having a seventy-five percent or better completion rate were medical programs and all but one department in the fifty percent to seventy-five percent completers' group were in the health division.

Conversely, the second result showed the overall poor to mediocre record of the technologies and business divisions. All but one department (Mental Health) in the group which had more dropouts than graduates (twenty-five to fifty percent completers) were business and technical programs and of the six departments having the highest dropout rates (only twenty-five percent or less completions), two were business and four technologies.

Institutional characteristic results. Using a multivariate multiple regression analysis, the author attempted to determine the influence of institutional characteristics on STCC's attrition rate.

Following are the major findings for each of the six major attrition groups:

1. Dropout--no standard actually related to the percentage of dropouts.
2. Persister--selectivity of department was the single most powerful predictor in attaining academic success and completing a program on time.
3. Finisher--the single best predictor for this group was having fewer openings for a large number of eligible applicants.
4. Defaulter--the regression analysis clearly showed that having low standards (low selectivity) related directly to students becoming defaulters.
5. Stopout--low department standards related to a large number of stopouts.
6. Non-finisher--departments with low admissions standards tended to have more non-finishers.

The variable with the highest non-significant Pearson Correlation was selectivity. Thus the more selective the department, the fewer number of dropouts.

Using variables as a set, the canonical correlation found that departments which show overall high or positive characteristics will have more persisters and finishers.

Results and Conclusions

Two significant discriminant functions beyond the .001 level resulted from the discriminant analysis of student characteristics. (1) The strongest set of predictors found was that of the combination of high school rank and sex. Females with good grades in high school tended to be graduates (persisters and finishers). (2) The second function was primarily an age function which distinguished persisters and defaulters (younger) from the four other groups.

The discriminant analyses executed separately for each of the three career divisions were parallel to the overall analysis reported above. Within business, the socio-economic variate appeared as a predictor, a result which did not occur elsewhere.

In the study of the departmental characteristics, a single canonical correlation was found in analyzing the relationship of departmental characteristics to attrition. Generally, the higher a department was ranked on any characteristic, the greater was the percentage of persisters and finishers. The single best set of predictors from the canonical analyses was the number of openings and selectivity in admissions policy. This set clearly separated graduates from dropouts and other non-completers. The results indicate that a department that had fewer number of openings relative to the number of applicants and which was more selective in its admissions policies was more likely to have more students graduate.

Recommendations

The data for this study was collected for entering students in the fall semestersof 1973 and 1974, and this analysis and discussion are based on the attrition patterns of those matriculants. While it is possible that some action has been taken at STCC since that period to improve the student retention rate of the institution, the only step of which the author is aware and which should improve the admissions procedure, is a requirement that all students take the SATs. The fact that this report is the only (known to the author) attrition study of any type ever conducted at the college will mean, hopefully, that upon reading the results herein, the college administration will take positive steps to lower the dropout rate at STCC and thus improve its overall institutional performance.

Based on the results of both the student analysis and the data yielded from the study of departmental characteristics as they relate to attrition, the author makes the following recommendations.

STCC should undertake a revamping of its institutional admissions policies using data gathered and analyzed in this report as a mjaor basis for change. The current requirement that all incoming freshmen take the SATs is a move in the right direction.

A major effort should be made to avoid placing students in those departments, especially the technologies, when there is any question of the student's ability to perform in math or the sciences.

Greater attention should be given increased counseling as part of the intake process. This is particularly true for business students

where there appears to be a tendency to pursue a business program merely for the sake of being in a career division but without any apparent knowledge of what business studies are all about.

Older students, especially veterans should receive greater in-depth counseling regarding course requirements and the difficulty of programs selected.

A major review of curriculum requirements for all programs in the business and technical areas should be undertaken.

Increased emphasis should be placed on all students' ability to meet the minimum requirements for all career programs.

STCC should advise all department heads of the results of this study, and of the school's increasing need to improve its overall performance including its student retention rate. Faculty should be involved in the planning of all new admissions policies.

Because retrenchment is already a serious concern at STCC, efforts should be made to obtain supplemental funding (from an agency such as the Fund for the Improvement of Post-secondary Education) in order to support a major overhaul of the college's intake process. Data available from this study should be valuable in the preparation of such a request.

An effort should be made to expand the orientation of incoming students specifically in relation to the total aspects of a given department, that is, in addition to admissions criteria, ultimate employment opportunities, classroom approach used (e.g., great/small emphasis on hands-on training, math or science requirements).

faculty expectations of students, etc. This might be accomplished through individual, detailed brochures about each department, films or personal discussions with department faculty before a student is admitted to a program.

In view of its large number of defaulters, the business division should undertake a special program to fully acquaint potential business matriculants with every facet of that division's operation relative to what a student can expect and what will be expected of him or her.

Suggestions for Additional Research

This study addressed the attrition performance of STCC's career students only. In light of the high dropout rates of these career-oriented students, the author is concerned about the retention records of students in the two non-career divisions at STCC: general studies and liberal arts. A longitudinal study of the attrition rates of these two divisions would be valuable.

The Student Development Program at STCC is primarily a remedial division preparing students for entry into one of the regular career programs. It is suggested that an in-depth attrition analysis of Student Development enrollees be conducted to track the record of these students.

Additional consideration should be given to the importance of classroom characteristics as potential factors in attrition performance. While results of this study showed that admissions practices (selectivity and number of students taken) were the most significant variables in distinguishing between completers and leavers, additional examination

and/or use of variables such as student-faculty ratio, faculty credentials and the like may be warranted.

Information on racial characteristics was not available for use in this study. And yet STCC, because of its location, draws heavily from its nearby Black and Hispanic neighborhoods. For this reason, in order to better serve its minority students who are making up an increasingly large percentage of the student body, the author suggests a joint study with the Springfield Urban League, the Springfield Spanish American Union and STCC to analyze the special needs of these students.

FOOTNOTES

[1]For example, in the Comprehensive Directory of Dissertations--Years 1861-1976, under a welter of related headings (Dropout, Dropouts, Dropped, etc.), over 275 theses were written ranging from case studies of sixth grade students identifying those capable of high school graduation and those likely to drop out to several studies devoted to dropouts in doctoral programs. Approximately sixty additional studies appear under Attrition and two entire pages of dissertation abstracts deal with Student Persistence (or lack of same). At least two theses analyze the literature of attrition studies.

[2]Daniel Schreiber, Profile of the School Dropout, (New York: Random House, 1967) p. 1.

[3]The NORCAL study lasted three years and gathered and analyzed data for over 75,000 students. Because of the large number of schools involved and varying types of methodologies used, the results, some of which were conflicting, were less than clear.

[4]Thos. MacMillan and Donald Kester. "Promise to Keep: NORCAL Impact on Student Attrition," The Community and Junior College Journal, Vol. 43, No. 5, Feb. 1973.

[5]Most experts use the year 1973 as the year the academic "crunch" began in earnest. The business cycle confounded economists as the nation continued in its worst recession since the 1930's Great Depression and inflation showed no signs of abetting. Aside from a decline of births, the three basic sources of funds had diminished, all in some degree due to the increase of unemployment which reduced the available financing for higher education. These were (1) government grants, (2) parental accumulations and (3) student earnings from parttime or summer employment. Edward H. Witkowski, "The Economy and the University: Economic Aspects of Declining Enrollments." The Journal of Higher Education. Vol. XV, No. 1, Feb. 1976.

[6]Department of Health, Education and Welfare, Back to School. U.S. Government Printing Office, No. FSf.280:80053, Washington, D.C. 1976, pp. 6-14.

[7]Dresch's study took into account changes in the demand for college education, people in the labor force, changes in the supply of young people in the population and in the proportion of young people going to college. Stephen F. Dresch, Journal of Political Economy, Yale University Press, Sept. 1976.

[8]National Center for Education, Sixth Annual Report, Washington, 1976, p. 91.

[9]The author suggests that while there is definitely a net gain involved in going to college, the gain is falling and for more and more people it may become reasonable not to go on to higher education. Richard Freeman, The Over-Educated American. (Harvard University Press, Boston, MA 1976) p. 5.

[10]Spekke computed this rate by projecting the lifetime earnings of a college graduate, minus tuition and other costs and lost income while in college. His data showed that while college graduates still exceed high school graduates in dollars earned, the ratio, stable since World War II, dropped from 53 percent to 40 percent between 1969 and 1974. Among 25 to 30 year olds, the ration plummeted from 39 percent to 23 percent. Andrew Spekke, "Is Going to College Worth the Investment?" The Futuristic, Fall 1976, p. 297.

[11]Carnegie Foundation for the Advancement of Teaching, The State and Higher Education: A Proud and Vital Past and Vital Future, New York, May 1976, p. 67.

[12]Gale O'Brien, "Colleges Optimistic," Chronicle of Higher Education, Feb. 17, 1976, p. 1.

[13]New York Times, Colleges Optimistic About Future, June 5, 1977, p. 31.

[14]D. Kent Halstead, Higher Education Prices and the Price Index, 1961-75, U.S. Government Printing Office, Washington, D.C., 1976, pp. 21-31.

[15]J. Magarral, "Austere Budgets Ahead?" Chronicle of Higher Education, Feb. 9, 1976, p. 1.

[16]"Retrenchment Hits U. of Washington," Chronicle of Higher Education, July 26, 1976, p. 3.

[17]Ibid.

[18]New York Times, City Schools Retrenching, Jan. 3, 1977, p. 1.

[19]This event, which took place officially on September 7, 1976, formally ended the tradition of free education which had prevailed since the University's oldest unit, City College of New York, was founded in 1847.

[20]New York Times, Times Interviews Kibbee, July 25, 1976, pp. 15-16.

[21]In many ways this movement directly parallels the educational policies of immediate post World War I when the first large-scale effort to implement mandatory high school education took place.

[22]J. Magarral,"They're Putting Lids on Enrollments," Chronicle of Higher Education, Nov. 31, 1975.

[23]Advanced Institutional Development Program Grant Application, Title III. Springfield Technical Community College, Springfield, Mass., Oct. 1975, pp. 5-7.

[24]A subtle distinction of semantics distinguishes between the words "attrition" and "dropout." Since attrition virtually always exists (e.g., even at a school with almost no early leavers), the word should not necessarily have a negative connotation and, in fact, does not always carry one. Yet the same might be said of "dropout" (e.g., a school could have a one percent dropout record which would be outstanding). Nevertheless, "dropout" over the years has definitely become more of a term of opprobrium than the word "attrition."

[25]A. Astin, Preventing Students from Dropping Out. San Francisco: Jossey-Bass, 1975 pp. 1-21.

[26]Springfield Technical Community College Catalog, 1973-74, Springfield, Mass., 1973.

[27]David L. Angus, The Dropout Problem: An Interpretive History, (Dissertation) Ohio State University, 1965.

[28]Edward Henry Hammond, The Prediction of Early Attrition from College, (Dissertation) University of Missouri-Columbia, 1971.

[29]Milton Arthur Partridge, An Analysis of Selected Education Philosophies as Pertinent to the Dropout Problem, (Dissertation) University of Cincinnati, 1964.

[30]Cathlene M. Kubiniec, "The Relative Efficacy of Various Dimensions of Self-Concept in Predicting Academic Achievement," American Educational Research Journal, May 1970.

[31]Anne S. Berg, Selected Factors of Dropout and Non-Dropout Freshman under Open Admissions at Queens, (Dissertation) Fordham University, 1973.

[32]Edward Anthony Colozzi, Did They Leave for the Best of Reasons, A Study of Persisters and Dropouts in An Open Admissions Community College, (Dissertation), Columbia University, 1973.

[33]A. W. Astin, Preventing Students from Dropping Out, San Francisco: Jossey-Bass Publishers, 1975.

[34]Kenneth Feldman, "Measuring College Environments: Some Uses of Path Analysis," American Educational Research Journal, Jan. 1971.

[35]Harvey S. Gum, A Study of Dropout Propensity of Selected Community College Students, (Dissertation) Oregon State University, 1977.

[36]M. Fishbein, "The Method of Constructing an Attitude Scale (Rensis Likert)" Readings in Attitude Theory and Measurement, New York: Wiley, 1967.

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